CHEMICAL LIBRARY

AUG 1 1935

For Those Who Have Not Decided on the Portland Trip This Is the Call; for Those Who Have—It Is a Suggestion to Get Ready. Every Issue of This Year Has Had Publicity of the Plan and Meeting. See June and July Numbers.

Vol. XXIV, No. 7 JULY, 1935

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

CONTENTS

Frontispiece and Sketch—John Ingalls 535
Editorial:
After Eighty-Three Years—Portland 536
Contributory Professional Service 536
The Blue Eagle and the NRA 537
Scientific Section:
Drug Extraction. III. The Function of Preliminary Maceration in Relation to the Percolation of Belladonna Root—Husa and Yates 538
Phytochemical Notes—Xavier 543
The Chemistry of Heptane and Its Solutions—Semb 547
Therapeutic Substances Derived from Unsymmetrical Diphenyl Compounds III. Some Aryl Esters of the Hydroxy Diphenyls—Harris and Christiansen 553
Saliva Tests. III. Detecting the Administration of Some Opium Derivatives to Horses—Munch 557
The Assay of National Formulary Preparations Containing Bismuth—Jenkins and Millett 561
Potassium Guaiacol Sulphonate—Clark and Kirch 564
A Comparative Study of Enteric Coatings—Bukey and Rhodes 567
Enteric Coatings. I. A Laboratory Method for the Study and Control of Enteric Coatings—Wruble 570
An Unusual Mortar and Pestle—Kramer 574
The Sir Henry S. Wellcome Medal and Prize 575
The Microscopy of Powdered Desiccated Endocrine Glands—Youngken 576
The Department of the American Association of Colleges of Pharmacy 577
Association Business 581
Editorial Notes 584
Personal and News Items 585
Obituary 586
Societies and Colleges 587
Notice to Contributors to the Journal American Pharmaceutical Association 600
Pharmaceutical Abstracts 141–176
Advertising—Cover Pages 2, 3 and 4 and pp. I–XXII.

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THE 83rd ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN PORTLAND, ORE., AUGUST 5–10, 1935.

Local Secretary, A. O. Mickelsen, N. E. 6th Ave. at Oregon St., Portland, Ore., Hotel Multnomah, Headquarters.

The 1935 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar will also be held in Portland.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917; authorized July 10, 1918.

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E. F. KELLY, Secretary,
2215 Constitution Ave.,
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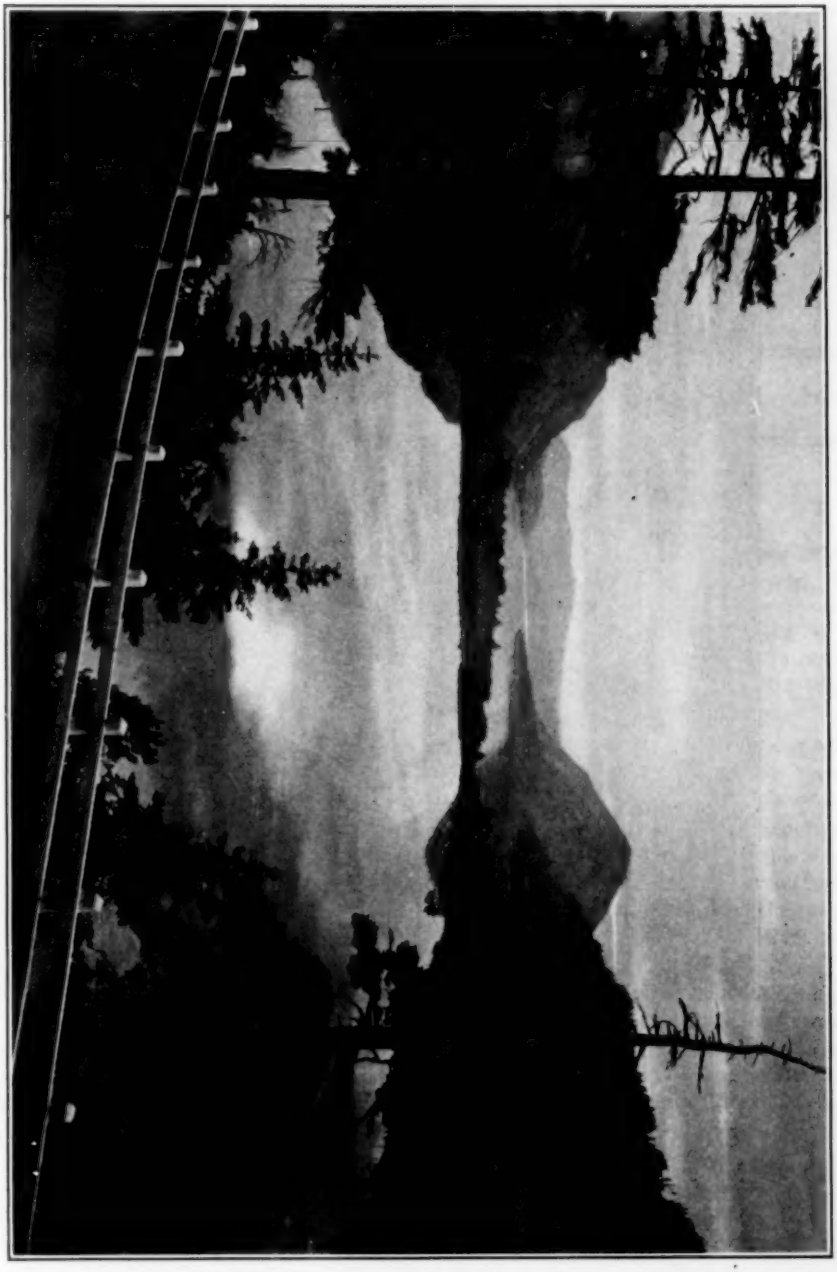
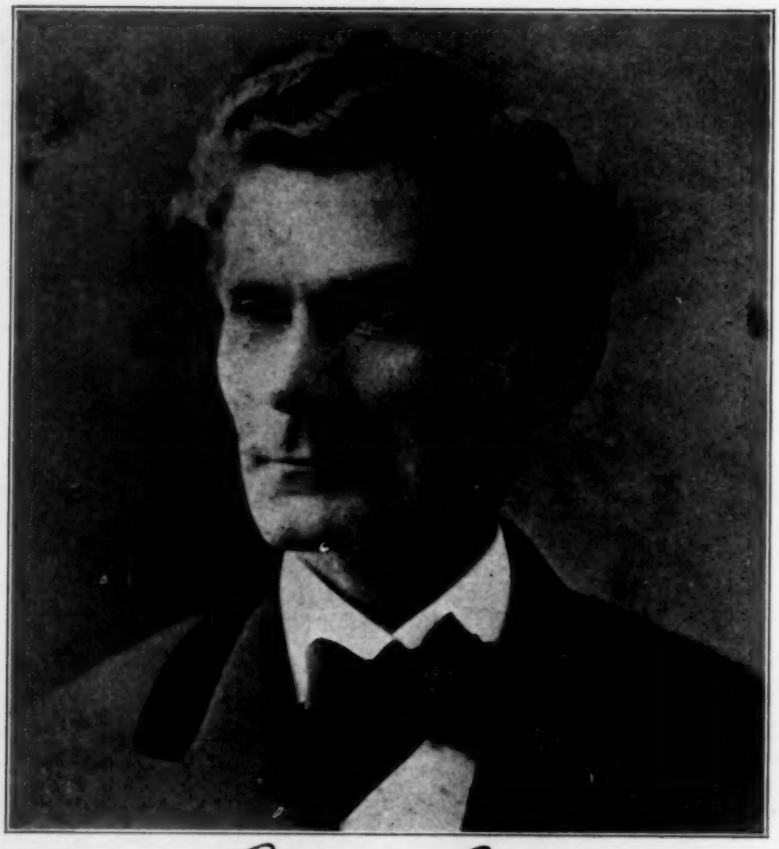
For rates and routes to Portland see this and preceding issues of the JOURNAL.



An inspiring vista of the Columbia River and Gorge as seen from the Columbia River in Oregon. Saturday, August 10th, will be an all-day scenic drive up Columbia River Highway, including a visit to the Bonneville Dam and an out-door luncheon featuring Columbia River salmon.

If you have not planned for your trip to the Portland meeting of the A. PH. A. you should do so promptly.



John Ingalls.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XXIV JULY, 1935 No. 7

1885–1935.

The 33rd annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in Pittsburgh, Pa., September 8, 1885. It was at this meeting that the third contribution on "Precipitates in Fluidextracts" was presented by our senior member, J. U. Lloyd. We now know the value of that research in pure and applied science. Dr. A. B. Prescott, in commenting on this work said, "The series of papers has been of great value;" he considered the work "a notable example of the fact that true research is reported from the field of applied science as well as that of pure science."

Mention is made of the foregoing, because during the more than sixty years our senior member served this ASSOCIATION, he carried the message of pharmacy to the public, and by his writings and other activities the fact has never been permitted to dim that he was and is a pharmacist.

John Ingalls, pharmacist of Macon, Ga., president of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1885, was born in New Bern, N. C., in 1829, where he received his earlier education and, later, engaged as clerk in a drug store. Upon attaining majority he removed to Charleston, S. C., and thereafter was engaged in a pharmacy in Columbia, first as clerk and then as proprietor. In 1860, he became proprietor of a Macon, Ga., pharmacy, until his death November 12, 1898.

Mr. Ingalls was a courtly, polished gentleman of the old school, and of unusual moral and physical courage. He always endeavored to promote pharmacy, and gave his fellows a deeper appreciation of the profession and a high valuation of its service. He took an active part in association work and served as president of Georgia Pharmaceutical Association. Before his election as president of the A. PH. A., Mr. Ingalls held vice-presidential offices and afterward became a member of the Council.

THE OREGON TRAIL.

The Oregon Trail was an emigrant route about 2000 miles in length, from Independence, Mo., to the Columbia River. Originally, like many of the main roads of the country, it was made in some parts by Indians and trappers. A part of it was blazed by Vérendrye in 1742 and the expedition of Lewis and Clark in 1804.

EDITORIAL

E. G. EBERLE, EDITOR 2215 Constitution Ave., WASHINGTON, D. C.

AFTER EIGHTY-THREE YEARS—PORTLAND.

WHEN the AMERICAN PHARMACEUTICAL ASSOCIATION was organized, Oregon had not yet reached Statehood. Its influence upon pharmacy in the great Pacific Northwest preceded its formal contact with the pharmacists of that delightful section of our country by eighty-three years. We have enjoyed and profited by the influence of pharmacists of the West and Northwest for many years. They have served as officers and committee members in the AMERICAN PHARMACEUTICAL ASSOCIATION and have taken active part in its major activities. However, it remains for the 1935 Convention of the ASSOCIATION to cement by personal contact the bonds of friendship and professional relationship which have been fostered over the years between the pharmacists of the Northwest and the general membership of the ASSOCIATION.

To many pharmacists of the Northwest the AMERICAN PHARMACEUTICAL ASSOCIATION has been largely a symbol, albeit an intangibly important factor in the progress of their profession. Comparatively few have had the opportunity of actually participating in the deliberations of Sections and General Sessions. Both the ASSOCIATION and the individual pharmacists of the Northwest have been losers through this lack of personal contact.

It is significant that in these days of rapid change in our social and economic structure with its inevitable effect upon the future of the profession of pharmacy and the drug industry, the center of interest will be shifted momentarily from Washington, D. C., to Portland, Oregon. It will be a good thing for those engaged in the management of the affairs of the ASSOCIATION to gaze at the usual center of their activity from a distance of several thousand miles, and experience the advantages of the background of those who are for geographic reasons always several thousand miles distant from Washington. Undoubtedly we of the East shall learn a great deal, and if in the learning we may also be privileged to impart a point of view and, perhaps, some specific information on some of the problems that confront us, our profession as a whole will profit measurably by the opportunity for interchange of opinions thus afforded.

Pharmacy is beset by many problems and the economic situation has greatly intensified some of them. We must face these problems squarely and we must solve them with courage and intelligence. We expect the Pacific Northwest to supply the type of inspiration which carried the pioneers to the great heights that built an empire where once there was barrenness and waste. We look forward to Portland with eager anticipation. The eighty-third annual convention should make history.—ROBERT P. FISCHELIS, *President*, A. PH. A.

CONTRIBUTORY PROFESSIONAL SERVICE.

THE reports on Drug Extraction are being continued and in connection with the fundamental principles of the methods the extraction of a series of drugs of different types is being studied. The subject has received consideration from

every angle and brings to the pharmacist a knowledge and understanding of the general processes of drug extraction.

Several papers have recently dealt with the methods of drug administration and most careful observation has been made of the promptness with which certain forms of medications are effective and in that connection the value or insufficiency, usefulness or unfitness of certain administration forms.

The determination of the reasonable or permissible margin of error in dispensing has been made the subject of comprehensive and detailed experimentation and research for a number of years and important information has been added to the records relative to utensils, apparatus and skill which may influence variation. The physical properties of the liquid, suspension or powder to be dispensed or compounded in the prescription have been carefully studied.

Other points of prescription practice in articles of recent issues of the JOURNAL have reported the accuracy and speed factors in the filling of capsules by hand, the rate of distintegration in medicinal tablets and the variance of hypodermic tablets.

Thus pharmacists owe much to their fellows in coöperative endeavors, and the contributors to the work of the AMERICAN PHARMACEUTICAL ASSOCIATION have promoted pharmacy and, because of the research, medicine, pharmacy, the laity and the profession have benefited.

These thoughts have come forward, because each year the annual meetings carry messages and convey information which add to the sum and substance of knowledge and advance the cause of the profession and individuals therein engaged.

The pharmacist profits by the information he communicates to his fellows and thereby advances the profession. What will your contributions be to the programs of the sections this year?

THE BLUE EAGLE AND THE NRA.

JAMES L. O'NEILL, acting chief of the recovery agency, has indicated that there probably will be a continuation of the "Blue Eagle," perhaps as insignia of merit for industries carrying forward a certain standard.

President Roosevelt has made it known in the press conferences that all matters pertaining to voluntary business agreements to replace the codes will be handled by the Federal Trade Commission. James L. O'Neill, recently appointed acting NRA Administrator, has stated that his organization will devote its activities largely to the compilation of the history of the two years of life and to gathering information; the "archives division" is in charge of Leon C. Marshall. Several proposed NRA bills are still under consideration but it is doubtful if they will be enacted into law during this session of Congress.

The "Fair Trade Acts" are gradually being shaped to serve a most useful purpose, and with proper understanding and a determination to bring about what is intended, it is hoped, will result in helpful state measures, coördinated with other states in legalizing contracts which will establish a minimum price as an economic principle, and bring the public to a realization that price-cutting is destructive to seller and buyer, and that the effect is being impressed by untoward results, whereby the group or individual suffers.

SCIENTIFIC SECTION

BOARD OF REVIEW OF PAPERS.—*Chairman*, F. E. Bibbins, George D. Beal, L. W. Rising, H. M. Burlage, L. W. Rowe, John C. Krantz, Jr., Heber W. Youngken.

DRUG EXTRACTION. III. THE FUNCTION OF PRELIMINARY MACERATION IN RELATION TO THE PERCOLATION OF BELLADONNA ROOT.[1,2]

BY WILLIAM J. HUSA[3] AND S. B. YATES.[4]

As a part of the general study of the fundamental principles of drug extraction, which is being carried out in the Department of Pharmacy of the University of Florida, some of the factors influencing the extraction of belladonna root have been studied. The work reported in this paper deals with the function of maceration, both before and after packing the drug in the percolator, in relation to the percolation of belladonna root.

HISTORICAL REVIEW.

Variations in U. S. P. Percolation Methods.—Since the introduction of the process of percolation in the U. S. P. of 1840, changes have been made in the time of maceration.

TABLE I.—VARIATIONS IN TIME OF PRELIMINARY MACERATION IN U. S. P. PERCOLATION METHODS.

U. S. P.	Time of Maceration. Before Packing.	After Packing.
1840	24 hours	0
1850	0 to 14 days	0
1860	0	0
1870*	0	4 days
1880	0	48 hours
1890	0	48 hours
1900	0	48 hours
1910*	6 hours	48 hours
1920*	6 hours	48 hours

* Type processes are given.

Moistening and Maceration before Packing.—The moistening and preliminary maceration of a drug is one of the established steps in percolation. According to Couch (1) the purpose of preliminary maceration is to assist in packing, to allow a modification of the drug constituents and to insure the saturation of every particle of drug with menstruum so that the actual percolation may affect all the drug evenly.

In 1833 the Boullays, father and son (2), recommended that the drug be packed dry in the percolator. Dausse (3) in 1836 suggested that the powdered drug be moistened with half its

[1] Presented before the Scientific Section, A. PH. A., Washington, D. C., 1934.

[2] This paper is based on a thesis presented to the Graduate Council of the University of Florida by S. B. Yates, in partial fulfilment of the requirements for the degree of Master of Science in Pharmacy.

[3] Head Professor of Pharmacy, University of Florida.

[4] Holder of a University of Florida Graduate Scholarship, 1933–1934.

weight of cold water, and allowed to macerate for several hours before introducing it into the apparatus for extraction. In 1841 Deane (4) stated that no further maceration was required than might be necessary to complete the swelling process. Procter (5) recommended maceration before packing when using aqueous or weakly alcoholic menstrua, but not when percolating with alcohol or ether. In 1889 J. U. Lloyd (6) advocated that, in percolation with hydro-alcoholic menstrua, the drug be macerated with water alone and that the alcohol necessary to bring the menstruum up to the proper strength be added just before packing.

In 1904 experiments were reported from Greenish's laboratory by Hooper (7) who moistened 200-Gm. portions of belladonna root with 50-, 100- and 150-cc. portions of menstruum. It was found that extraction was most rapid when 50 cc. of menstruum was used to moisten 200 Gm. of drug. Later experiments by Todd (8) in which 100 Gm. of belladonna root in No. 40 powder was packed dry, and further 100-Gm. portions moistened with 50 cc. and 100 cc., respectively, of menstruum, showed that most rapid extraction resulted from dry packing.

Bennett and Cocking (9) stated that "It is generally agreed that in small scale operations percolation proceeds more evenly, and consequently a drug is exhausted more quickly when a relatively small quantity of menstruum is used to moisten it."

Recently the purpose and necessity of the moistening and maceration of the drug prior to packing has been questioned by W. L. Scoville (10).

Maceration after Packing in the Percolator.—In 1864 Procter (11) approved of long maceration after packing the drug in the percolator. Likewise, Savage (12) in the same year showed by experiments with calumba, catechu, cinchona, cinnamon, gentian, myrrh, opium and rhubarb that long maceration produces a much more saturated first percolate. Campbell (13) in 1869 stated that the process of percolation is dependent on the important step of maceration. He moistened and packed the drug and allowed it to macerate for 4 days in a conical percolator, previous to percolation. Taylor (14) in 1869 carried out experiments which indicated that long maceration was an important requirement for thorough and complete exhaustion of a drug by percolation.

Vacuum Maceration.—In 1869 Duffield (15) advanced the idea that a more perfect maceration could be obtained if the ground drug were placed in a strong cylinder, the air pumped out, and the requisite amount of menstruum admitted. He stated that "... the pores of the comminuted drug give up the air enclosed in them, and when the menstruum is allowed to flow in, it is forced into these pores by the pressure of the air outside."

EXPERIMENTAL PART.

The drug used was from a 125-pound shipment of belladonna root previously described (16).

Variation in the Amount of Moistening Liquid.—Comparative percolations were carried out on 100-Gm. portions of belladonna root in No. 40 powder, using varying amounts of menstruum for moistening the drug, but keeping all other factors as nearly constant as possible. The U. S. P. process for the preparation of the fluidextract was followed, using the menstruum of alcohol five volumes—water one volume, but with the variation that 80 cc. of reserve percolate was set aside in each case and further percolates collected in successive 100-cc. portions. The quantities of menstruum used in moistening the various 100-Gm. portions of the drug were as follows: 0, 25 cc., 60 cc. and 90 cc. Otherwise the U. S. P. details were followed, *i. e.*, the drug was allowed to macerate for 6 hours before packing in the percolator and 48 hours after packing. The successive percolates were collected without interruption.

TABLE II.—EFFECT ON PERCOLATION OF THE AMOUNT OF LIQUID USED IN MOISTENING BELLADONNA ROOT FOR PRELIMINARY MACERATION.

A. Gm. of Alkaloid in Various Portions of Percolate.

Percolates.	0.*	25 Cc.*	60 Cc.*	90 Cc.*
80 cc.	0.411	0.434	0.460	0.281
100 cc.	0.030	0.026	0.054	0.164
100 cc.	0.004	0.008	0.006	0.006
100 cc.	0.000	0.000	0.000	0.000
100 cc.	0.000	0.000	0.000	0.000
Totals	0.445	0.468	0.520	0.451

* Quantity of menstruum used in moistening 100 Gm. of drug for preliminary maceration.

B. Gm. of Total Extractive Contained in the Various Percolates.

Percolates.	0.*	25 Cc.*	60 Cc.*	90 Cc.*
80 cc.	11.19	10.05	8.38	7.55
100 cc.	8.41	8.43	8.95	7.45
100 cc.	2.40	3.10	3.63	4.02
100 cc.	0.95	1.24	1.54	1.99
100 cc.	0.59	0.65	0.78	1.09
Totals	23.54	23.47	23.28	22.10

* Quantity of menstruum used in moistening 100 Gm. of drug for preliminary maceration.

C. Per Cent of Total Alkaloid Contained in:

Quantity of Menstruum Used for Moistening 100 Gm. of Drug.	First Percolate.	First 2 Percolates.	First 3 Percolates.
0	92.4	99.1	100.0
25 cc.	92.7	98.3	100.0
60 cc.	88.5	98.9	100.0
90 cc.	62.3	98.7	100.0

The results in Table II indicate that the rate of extraction of alkaloid is equally rapid when no liquid is used for moistening and when 25 cc. is used for 100 Gm. of drug. Using 60 cc. there is a slight reduction in yield of alkaloid in the first percolate and using 90 cc. there is a material reduction. In each case all the alkaloid is contained in the first 280 cc. of percolate. The yield of total extractive in the reserve percolate varies inversely with the quantity of moistening liquid used.

The Function of Maceration before and after Packing in Relation to Percolation of Belladonna Root.—The object of the following experiment was to determine the effect of varying the time of maceration, both before and after packing in the percolator, on the rate of extraction of belladonna root.

100-Gm. portions of belladonna root in No. 40 powder were percolated by the U. S. P. method for the preparation of fluidextract of belladonna root but varying the time of maceration as will be indicated; 80 cc. of reserve percolate was collected in each case in ten hours and set aside, after which successive portions of 100 cc. of percolate were collected, three hours being taken for collection of each portion. In each case 60 cc. of menstruum was used for moistening 100 Gm. of drug.

TABLE III.—EFFECT OF TIME OF MACERATION ON THE PERCOLATION OF BELLADONNA ROOT IN NO. 40 POWDER.

A. Gm. of Alkaloid in Various Percolates when Maceration Was as Follows:

Percolates.	0–0.*	0–24.*	0–48.*	24–48.*
80 cc.	0.387	0.419	0.396	0.417
100 cc.	0.081	0.072	0.064	0.065
100 cc.	0.010	0.009	0.009	0.094
100 cc.	0.000	0.000	0.000	0.000
100 cc.	0.000	0.000	0.000	0.000
Totals	0.478	0.500	0.469	0.576

B. Gm. of Total Extractive Contained in Various Percolates.

Percolates.	0–0.*	0–24.*	0–48.*	24–48.*
80 cc.	8.64	8.30	8.26	10.39
100 cc.	7.63	7.64	7.74	7.47
100 cc.	3.71	3.58	3.60	2.69
100 cc.	1.61	1.62	1.82	1.32
100 cc.	0.85	0.80	0.92	0.55
Totals	22.44	21.94	22.34	22.42

C. Per Cent of Total Alkaloid Contained in:

Hours of Maceration. Before Packing.	After Packing.	First Percolate.	First 2 Percolates.	First 3 Percolates.
0	0	81.0	95.8	100.0
0	24	83.8	98.2	100.0
0	48	84.4	98.1	100.0
24	48	85.8	99.6	100.0

* The first number indicates the hours of maceration before packing in the percolator and the second number shows the number of hours of maceration after packing.

The results in Table III clearly show that in the case of belladonna root in No. 40 powder maceration either before or after packing is not of appreciable value in promoting rapid extraction of alkaloids. The total extractive is higher in the reserve percolate in the batch that was macerated before and after packing; this advantage almost disappears by the time the fourth percolate is collected.

The Effect of Variations in Preliminary Maceration.—100-Gm. portions of belladonna root in No. 40 powder were subjected to varying types of preliminary maceration as will be indicated. The drug was then packed in the percolator, and percolation conducted immediately. In each case 80 cc. of percolate was collected in four hours, after which successive 100-cc. portions were collected in two-hour periods. The variations in preliminary maceration were as follows:

Sample A: The drug was macerated with 60 cc. of the official menstruum for 6 hours before packing in the percolator.

Sample B: The drug was macerated for 6 hours with water equivalent to 60 cc. of the official menstruum, the alcohol necessary to bring it up to the official menstruum strength being added just before packing.

Sample C: A flask containing the drug was evacuated for 3 hours, using a Cenco Hyvac pump. Sixty cc. of the official menstruum was then added through a separatory funnel placed through the stopper, the flask being shaken until the powder appeared uniformly damp. The mixture was macerated for 6 hours. The drug was then packed and percolated immediately.

TABLE IV.—EFFECT OF VARIATIONS IN PRELIMINARY MACERATION ON THE PERCOLATION OF BELLADONNA ROOT IN NO. 40 POWDER.

	A. Gm. of Alkaloid in Various Portions of Percolate.			B. Gm. of Total Extractive Contained in:		
Percolates.	Sample A.	Sample B.	Sample C.	Sample A.	Sample B.	Sample C.
80 cc.	0.382	0.378	0.406	8.55	7.31	8.18
100 cc.	0.074	0.094	0.065	7.25	7.33	7.22
100 cc.	0.009	0.008	0.007	6.22	5.38	6.53
100 cc.	0.000	0.000	0.000	3.62	4.61	4.40
100 cc.	0.000	0.000	0.000	2.47	2.54	2.18
Totals	0.465	0.480	0.478	28.11	27.17	28.51

C. Per Cent of Total Alkaloid Contained in:

Sample.	First Percolate.	First 2 Percolates.	First 3 Percolates.
A.	82.2	98.1	100.0
B.	78.8	98.3	100.0
C.	84.9	98.5	100.0

The results in Table IV indicate that preliminary maceration with water alone, with subsequent addition of alcohol, has little or no advantage over maceration in the usual manner. Vacuum maceration also appears to offer no particular advantage, as far as present results go. The results show that slightly more alkaloid is extracted by vacuum maceration in the first percolate than by the usual method of maceration. However, all the alkaloid is contained in the first 280 cc. in each case.

DISCUSSION OF RESULTS.

The results obtained in the present investigation show that dry packing works equally as well as moistening with 25 cc. of liquid per 100 Gm. of drug, but that extraction is slower with larger quantities of moistening liquid. Hooper's results (7) agree with these in showing that quantities above 25 cc. decrease the rate of extraction. Todd's results (8) agree with these in showing that dry packing gives more rapid extraction than moistening with large proportions of liquid, but as Todd did not try any quantities of moistening liquid between 0 and 50 cc. per 100 Gm. of drug he failed to discover that moistening with small proportions of menstruum did not hinder extraction. The lack of advantage in moistening the drug verifies Scoville's contention (10) that the 6 hours of maceration before packing is not needed on account of rate of solubility or to allow time for osmosis. It would seem that in the case of powdered drugs which swell only slightly in the menstruum used the preliminary maceration serves no useful purpose.

In regard to the results on the quantity of moistening liquid used, it is interesting to note that similar results have been found for other drugs. Thus Lenton (17) found that in the percolation of coca leaves, on reducing the amount of menstruum used for moistening the drug, more than half of the alkaloid was obtained in the reserve percolate, while with the official British Pharmacopœial quantity of moistening liquid, the greater part of the alkaloid was contained in the "weak percolate." His results on cimicifuga and aconite were similar.

The previous workers in this field have failed to explain why an increase in the amount of moistening liquid decreases the rate of extraction. Considering the results in Table II it may be said that several factors have a bearing on the results. When no moistening liquid is used, it is evident that all of the liquid appearing as reserve percolate must traverse the entire column of drug. But when the drug is moistened before packing the result is that when percolation is started most of the liquid used in moistening reaches the bottom of the percolator without passing through the entire column of drug. When 90 cc. of moistening liquid is used and 80 cc. of reserve percolate collected it is obvious that more than 10 cc. of the moistening liquid is still in the percolator when the reserve is set aside, and the portion remaining in the percolator is that which has traversed the greatest distance through the drug. However, when only 25 cc. of moistening liquid was used, extraction of alkaloid was just as efficient as when the drug was packed dry. This would indicate that small quantities of moistening liquid may become rather fully saturated so that nothing would be gained by passing through more of the drug. But when more moistening liquid is used than can become saturated, the reserve percolate is less concentrated. From Table II, Part B, it is possible that certain easily soluble extractives dissolve in a very small amount of moistening liquid so that even 25 cc. of moistening liquid results in dilution as far as these constituents are concerned, since the total extractive in the reserve percolate is reduced even by 25 cc. of moistening liquid.

It is interesting to note that maceration after the liquid has begun to drop from the percolator is of very little benefit in the percolation of belladonna root with the official menstruum. This result is in accord with Husa and Magid's findings (16) that equilibrium is quickly attained in maceration with an excess of liquid. The results cast considerable doubt on the necessity and wisdom of the 48-hour macera-

tion period after packing as specified in the U. S. P. X type processes A, B and C for fluidextracts. In the present tests, the results with 19 hours of percolation were equally as good as with 91 hours of combined maceration and percolation. This saving of time is of importance. J. U. Lloyd (18) found that percolation without maceration was best for the preparation of fluidextract of cimicifuga. It remains to be seen whether maceration in connection with percolation is important for other drugs. Probably the most logical way for the U. S. Pharmacopœial Revision Committee to handle this problem would be to introduce a type process for percolation without any maceration either before or after packing. This type process could be specified for only those drugs which are found from time to time to be extracted equally as rapidly and completely without maceration as with maceration.

SUMMARY.

Percolation experiments indicate that maceration before or after packing is of no advantage in promoting more rapid extraction of powdered belladonna root. When the amount of moistening liquid is not kept down to a low proportion there is a decrease in rate of extraction. No advantage is apparent in (*a*) vacuum maceration, or (*b*) preliminary maceration with water alone, with subsequent addition of alcohol.

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(1) Couch, *Am. J. Pharm.*, 92, 785 (1920).
(2) Boullay and Boullay, *J. pharm. chim.* [2], 19, 281 (1833).
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PHYTOCHEMICAL NOTES.*

No. 113. An Unusual Peppermint Oil.

BY SISTER M. FRANCIS XAVIER.

As a preliminary to the study of a number of Mentha materials, largely hybrids of which only small amounts were available, a lot of about 370 cc. of peppermint oil.

* From the Laboratory of Edward Kremers.

1930, was examined. The oil had been distilled by A. J. Schwarz and E. Baillie, August 11, 1930, from material harvested from the strain of *Mentha piperita* L. which has been raised in the Pharmaceutical Garden of the Wisconsin Pharmaceutical Experiment Station for a number of years under the direction of Professor W. O. Richtmann.

In October 1931, the oil had acquired a decided orange tint, was cloudy and had deposited a resinous sediment. Nevertheless, the odor was still pleasant though penetrating. After the physical and chemical constants had been determined, the bulk of the oil was rectified by steam distillation; 307.8 Gm. yielded 269.8 Gm. of practically colorless rectified oil, or a yield of 87.6 per cent. The aqueous distillate, approximately three liters, was twice cohobated, yielding 6.7 cc. and 4.0 cc., respectively, of oil. Added to the original rectified oil, the total amounts to 279.62 Gm. or 90.8 per cent. There remained, therefore, 9.2 per cent of non-volatile resinous material in the distillation flask. The acid value of this resin, recovered from the dried ethereal solution, was found to be 3.1, 2.6 and 2.7, respectively, in three determinations. So far as determined, the physical and chemical constants of the three oils are herewith tabulated:

	Crude Oil.	Rectified Oil.	First Cohobate.
d	0.9620 at 25°	0.9145 at 27°	0.9179 at 25° (1)
$n_{D25°}$	1.4721	1.4700	
α_D in 100-mm. tube	−32°	−9.42°	
Acid value	0.6	..	
Ester value	23.5 and 22.4	28.2	
Percentage ester	8.5% and 8%	10.1%	
Combined menthol	6.39%	7.8%	
Total menthol	55.40%	45.3%	
Free menthol	49.01%	37.5%	

Inasmuch as the U. S. P. states that the density of the official oil may vary between 0.896 and 0.908 at 25°, the oil must be regarded as an unusual product. Letters were, therefore, sent to the A. M. Todd Company of Kalamazoo, Mich., and to Fritzsche Bros. of N. Y. City inviting their comments. The Michigan distillers asked for a sample of the oil which was sent. The replies of both firms are herewith quoted with running comments in the form of foot-notes. To the data reported by the A. M. Todd Company the U. S. P. requirements were added in the table to admit of ready comparison.

"We do not think the sample is true *Mentha piperita*, as we know it, and its odor strongly suggests to us some type of horsemint (2). It resembles to some extent oils raised in Oregon and Washington from *Mentha piperita* but the constants are quite different than anything purporting to be Oil of *Mentha piperita* we have ever examined. We assayed a part of the sample you sent to us and below we give you both the analysis of your own oil and an average analysis of 1930 crop Peppermint raised in Michigan:

	Your Sample.	Average 1930 Crop.	U. S. P. Requirement.
Optical rotation	−7.62/25°	−25.50/25°	Varies between −23° and −33°/25°
Specific gravity	0.9166/25°	0.9001/25°	0.896 to 0.908/25°
Solubility	Insoluble in 70% alcohol Soluble in 1.1 vol. 80% alcohol	3 vol. 70% alcohol 4 vol. 70% alcohol slightly opalescent	Soluble in 4 vol. 70% alc. showing not more than a slight opalescence and no separation of oil globules

Ester	10.72%	7.8%	Not less than 5%
Total menthol	41.65%	52.7%	Not less than 50%
Refractive index	1.4705/20°	1.4620/20°	1.4600 to 1.4710/20° C.

"The temperature at which the Optical Constants have been taken is indicated. You will note a difference of about two points (0.002) in the Specific Gravity you quote, 0.9145/27°, and the Specific Gravity our laboratory indicates (3). In checking Gravity in our laboratory a pycnometer is used and a correction of 0.00075 is calculated per 1° C. in temperature. Refractive Index we find to be a dependable Constant and it seldom, even on very weedy (4) Peppermint, runs as high as 1.4630/20°. I think we have never seen a sample purporting to be Oil of Peppermint with as high a Refractive Index as the sample you submitted nor as low Optical Rotation. If the oil is true *Mentha piperita*, it is most abnormal in all respects."

Fritzsche Brothers returned two opinions: the first from the Clifton Chemical Laboratory, Clifton, N. J.; the second from the Chemical Laboratory of Schimmel & Co., Milititz b. Leipzig, Germany. Both are herewith quoted:

"The Peppermint Oil to which Prof. Kremers refers appears to be quite an unusual product. While the oils of 1930 generally have been higher in density than in former years, *i. e.*, 0.900 to 0.904, we never had any above 0.905.

"The keeping quality was very good; three samples from different sources showed a rise in density of only one point in the third decimal in each case after one year's standing."

"Wir bestaetigen Ihnen den Empfang Ihres Schreibens vom 6. d.M. und haben auf die Ausfuehrungen von Herrn Prof. Kremers zu bemerken, dass wir in den letzten drei Jahren an amerikanischem Pfefferminzoel spezifische Gewichte bis zu 0.905 (25°/25°) beobachtet haben, das will aber bei der verhaeltnismaessig geringen Anzahl von Oelen, die wir untersucht haben, nicht viel besagen und schliesst keineswegs aus, dass auch hoehere spezifische Gewichte vorgekommen sind. Jedenfalls halten wir ein spez. Gewicht von 0,911, wie es Herr Prof. Kremers an einem von ihm selbst destillierten Oel festgestellt hat, nicht fuer zu hoch, da nach den vorliegenden Beo bachtungen bei amerikanischem Pfefferminzoel tatsaechlich spezifische Gewichte bis zu 0,915 und darueber vorkommen. Dass der von der U. S. Ph. angegebene obere Grenzwert von 0,908 zu niedrig ist, haben wir bereits bei Besprechung des amerikanischen Arzneibuchs erwaehnt (Report 1926, 139) und gehen heute sogar noch einen Schritt weiter, indem wir als obere Grenze nichte 0,910 sondern 0.915 vorschlagen.

"Die Zunahme, die das spezifische Gewicht des in Rede stehenden Oels innerhalb Jahresfrist erfahren hat (von 0.911 auf 0,962), ist allerdings ziemlich gross und laesst auf starke Verharzung schliessen, die ja auch in dem hohen Rektifikationsrueckstand (12%) zum Ausdruck kommt. So starke Verharzungen kommen bei Pfefferminzoel besonders dann vor, wenn das verarbeitete Kraut sehr frisch gewesen ist, weil in diesem Fall leicht verharzende Bestandteile in das Oel hineingelangen, die bei vorherigem Trocknen des Krauts durch den Sauerstoff der Luft schnell in nicht fluechtige Harze uebergefuehrt und dadurch unschaedlich gemacht werden (5). Es soll damit nicht ohne weiteres behauptet werden, dass dies hier der Grund ist, vielmehr kann die Verharzung auch eine reine Zufallserscheinung sein, fuer die jede naehere Erklaerung fehlt, denn es ist ja bekannt, dass unter sonst gleichen Bedingungen das eine Oel groessere Neigung zum Verharzen zeigt als das andere, und das wird sich dann im Verlauf eines Jahres immerhin schon recht deutlich bemerkbar machen. Eine direkte Anomalie koennen wir selbst in einer starken Verharzung nicht erblicken, und ebensowenig darin, dass das spezifische Gewicht nach der Rektifikation des Oels hoeher bleibt als es urspruenglich gewesen ist, denn die Verharzungsprodukte sind natuerlich z. T. fluecktig und machen dann begreiflicherweise das Oel schwerer (5)."

In order to acquire a somewhat better insight into the nature of this unusual oil, 130 cc. of the rectified product were saponified and the saponified oil distilled with steam. The oily distillate (116 cc.) was collected in fractions, the volumes and densities of which are herewith recorded:

Fraction.	Volume.	$d_{25}°$.
I	60 cc.	0.9060
II	9 cc.	0.9174
III	47 cc.	0.9112

Thus it becomes apparent that little more than one-half of the saponified oil has a density within the specific gravity limits of the Pharmacopœia. Subjected to fractional distillation, the bulked rectified oil yielded the following results:

Fraction.	Volume.	$d_{25.5}°$.
–165°	1.0 cc.	....
165–185°	1.2 cc.	0.7646
185–200°	13.0 cc.	0.9119
200–220°	63.0 cc.	0.9171
220–240°	15.0 cc.	0.9144
Residue	12.0 cc.	....

Again it will be seen that the three larger fractions of the saponified (!) oil have densities greater than those of the pharmacopœial limits.

Fraction 200° to 220°, when placed in a freezing mixture, yielded crystals of menthol. Acetylation revealed the presence of 97.8% alcohol computed as menthol.

The absence of thymol and carvacrol has already been pointed out. The quantitative tests for pulegone likewise gave negative results (6).

This unusual oil shows once more how difficult it is to fix standards for volatile oils that will satisfy every one, even though the oil be a rectified product. Had the oil been of lighter density than the official lower limit, such a shortcoming could be corrected, even though with a loss, by the removal of some of the lower fractions. However, inasmuch as the density is too high, a corresponding correction might have involved a loss of menthol and menthol ester, unless the solubility tests reported by Todd indicate the presence of sesquiterpenes that could be removed Should the peppermint grower find that a large share of his crop yields such an oil as here reported, about the only thing he can do under the present U. S. P standard is to blend it with other oils that are relatively light.

REFERENCES.

(1) The first cohobated oil had separated into two portions: one floated on the aqueous distillate; the other was heavier than water. The latter was discarded after it had been ascertained by means of the Flueckiger test, that it contained neither thymol nor carvacrol.

(2) As already stated, the oil had been distilled from plants that have been under cultivation in the Pharmaceutical Garden for a number of years. Inasmuch as both horsemint and wild bergamot have been distilled repeatedly in the same still used for field operations, there was a bare possibility that contamination with the oil of either species of Monarda had taken place. However, this was excluded by making a Flueckiger test for thymol and carvacrol. The result was negative.

(3) Applying as correction for the difference in temperatures the factor 0.000755 (Schreiner), the Specific Gravity will be 0.91601/25°. Accordingly, the difference is only 0.00059, when comparison is made at the same temperature.

(4) Contamination with weeds is excluded, since the peppermint is cultivated in rows that are kept free from weeds. Should a single weed plant have been overlooked during the cultivation, this may be expected to have been discarded in the harvest. The Pharmaceutical

Garden has only a half acre experimental field of peppermint, hence, both cultivation and harvest are under rigid control.

(5) This explains satisfactorily the large amount of resin resulting upon rectification but does not account for the unusually high density of the rectified oil.

(6) Gildemeister, "Die aeth. Oele" (3rd ed.), 1, page 560.

THE CHEMISTRY OF HEPTANE AND ITS SOLUTIONS.*,[1]

No. 6. The Solubility of the Halogens in Heptane.

BY JOSEPH SEMB.

The heptane used was that prepared from some of the by-products obtained in the purification of hydrocarbon from Jeffrey Pine oil placed at the disposal of this laboratory in 1927 by the Ethyl Gas Corporation (1). The material employed (2) was first shaken with concd. sulphuric acid until no more charring occurred (loss 3.0 per cent). Next the oil was shaken with fuming sulphuric acid and allowed to stand over night. After that it was shaken successively with water, also with aqueous solutions of sodium carbonate, sodium hydroxide and potassium permanganate. Finally, it was dried with calcium chloride, refluxed for several hours over metallic sodium and distilled over phosphorus pentoxide. The bulk of the oil distilled within two degrees, *viz.*

550 cc. between 96.8° and 97°.

550 cc. at 97°.

550 cc. between 97° and 97.4°, barometric pressure 743 mm. The "Vorlauf" and residue amounted to 200 cc.

The chlorine (from a cylinder) used was purified by passing it through aqueous copper sulphate, water, concd. sulphuric acid and finally through a calcium chloride tower.

The bromine used was Merck's C.P. article.

Merck's U. S. P. iodine was used without additional purification.

The dissolved halogen was determined directly with standard sodium thiosulphate (standardized against potassium dichromate) in the case of iodine. In the case of chlorine and that of bromine, the iodine equivalent was set free by the addition of potassium iodide.

Bromine-Heptane Solution.		Iodine-Heptane Solution.	
Temp.	Wt. of 5 Cc. Aliquot.*	Temp.	Wt. of 5 Cc. Aliquot.
−78.0°	3.726 Gm.	−26.5°	3.495 Gm.
−77.0°	3.742 Gm.	0.0°	3.475 Gm.
[−51.0°	3.963 Gm.]	20.0°	3.448 Gm.
−44.5°	4.161 Gm.	34.5°	3.425 Gm.
−34.5°	4.438 Gm.	55.0°	3.395 Gm.
[−32.0°	4.137 Gm.]		
−29.0°	4.724 Gm.		
−28.0°	4.777 Gm.		
−26.5°	5.066 Gm.		

* The accompanying figure shows that the weights determined at −51° and at −32° are off.

The above values are plotted on Fig. 3.

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* Scientific Section, A. Ph. A., Madison meeting, 1933.

[1] From the Laboratory of Edward Kremers.

In this work the concentrations are reported in grams of halogen per 100 cc. of solution (not solvent). However, the weights of 5-cc. aliquots of the saturated bromine and iodine solutions were determined at different temperatures. The data are recorded below. These values together with those reported in subsequent tables makes it possible to calculate the solubilities on the gram or mole fraction basis.

Approximately 5 cc. of heptane, placed in a 25-cc. graduated cylinder and kept as remote from light as possible, were saturated with chlorine at the temperature stated, by bubbling the gas through the solvent. When the solution was saturated (15 to 30 minutes, depending on the temperature of experiment) the new volume was recorded. This was then diluted with heptane that was colder than the solution. This tended to cut down the amount of chlorine that might otherwise escape during the subsequent steps of transferring and titrating. It also diminished the losses due to reaction between the chlorine and the heptane.

In experiments Nos. 12, 13, 15, 16, 18, 20, 21, 24 and 25, Table I, all of the diluted solution was dumped into an Erlenmeyer flask and titrated. It is significant to note that in the above series the low temperature experiments gave low results. The other experiments reported in Table I were carried out somewhat differently. Not only was the original volume of the saturated solution recorded but also the volume of the diluted solution. A 5-cc. aliquot of this diluted solution was withdrawn and titrated. From these data the grams of chlorine dissolved in 100 cc. of solution were calculated and recorded in column "C," Table I. The values chosen for plotting on Fig. 1 are found in column "D."

In Table I, it will be observed that numerous experiments gave low results, particularly so for the low-temperature ones. This is probably due to one or both of two possibilities. Firstly, the solution may not have been saturated to start with; or if it had been, too much chlorine was lost in subsequent operations. Naturally, the higher the concentration of chlorine the more acute this danger becomes. In the second place, as chlorine and heptane do react, and as the increased concentration is favorable to secondary reactions, the discrepancy due to thermal secondary reactions, initiated by a photochemical reaction, should be greater at the higher concentrations of the lower temperatures. Several times, without apparent provocation, the reaction between chlorine and heptane became so violent that the experiment was lost. Usually this took place for the higher concentrations, and then when the gas had been bubbled through for a considerable period. This would indicate that the accumulation of HCl or probably heptyl chloride catalyzes this thermal reaction between chlorine and heptane. The data in column "E," Table I seem to verify these assumptions. Take, for instance, in experiments Nos. 5 and 6, the amounts of HCl found were small. Therefore, the low chlorine yield was not due to losses arising from the reaction between the chlorine and heptane, but the solution was probably unsaturated when removed from the saturating chamber.

In experiments Nos. 12 and 13, Table I, it will be noted that the amount of chlorine found is low, but that the amount of HCl found ("E") is very high. This would indicate that the heptane had been saturated with chlorine, and that the subsequent reaction between the chlorine and the heptane, with the formation of HCl and the liberation of heat, decreased the chlorine content.

The HCl was determined as follows: After the chlorine had been titrated as stated above the free HCl was titrated with standard NaOH using a methylene blue-phenolphthalein indicator. To establish whether $Na_2S_2O_3$ ($H_2S_2O_3$) or $Na_2S_4O_6$ ($H_2S_4O_6$) had any effect on this titration the following experiment was conducted. A solution containing I_2 was titrated with $Na_2S_2O_3$. To this was added 1 cc. of HCl solution equivalent to 9.25 cc. of 0.0818*N* NaOH. Three different titrations gave 9.38, 9.35, 9.05 cc. of 0.0818*N* NaOH or an average of 9.26 cc. Hence, for this work at least, the presence of the above named compounds does not hinder the titration of HCl with NaOH.

Taylor and Hildebrand (3) reported the solubility of chlorine in grams per 1 Gm. of solution at 0° to be 0.196, 0.205, 0.210 or an average of 0.2036 Gm. These investigators obtained erratic values at 20° and 40°, therefore, they did not report these values. As I have reported my solubilities in grams per 100 cc. of solution, an exact comparison is not possible.

When 10 cc. of bromine were added to 10 cc. of heptane, there was but one liquid phase. It is, therefore, assumed that bromine is miscible with heptane at

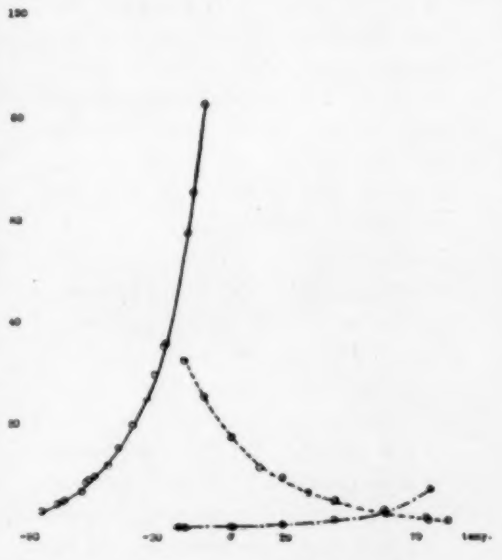

Fig. 1.— —— Bromine (unbroken line). – – – Chlorine (broken line). – · – · – Iodine (dots and dashes).

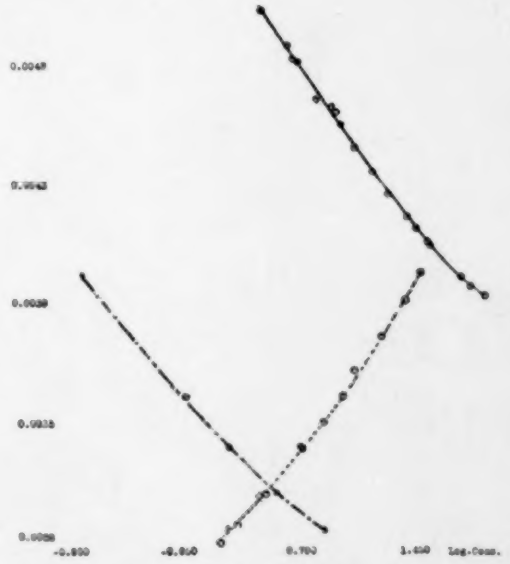

Fig. 2.— —— Bromine (unbroken line). – – – Chlorine (broken line). – · – · – Iodine (dots and dashes).

room temperature. Inasmuch as bromine congeals at low temperatures and melts at −7.3°, the bromine solutions were exposed to low temperatures and the solubility of the halogen in heptane determined. This was done by immersing a solution of bromine in heptane, in a test-tube, into a Dewar flask, cooled to the desired temperature by means of acetone and solid CO_2. The data obtained are recorded in Table II and plotted on Figs. 1 and 2. 2-Cc. aliquots were used in the determinations. The solubility of iodine was determined in a similar manner except that a Dewar flask was not used. The values obtained for iodine are reported in Table III and plotted on Figs. 1 and 2.

From Fig. 2 it will be noted that for both the bromine and the iodine, plotting 1/T against the log of the concentration, gives practically a straight line up to a

certain temperature, whereas in the case of chlorine a distinct curve is obtained. In the case of bromine this temperature is about $-40°$ and for iodine about $+40.0°$. This indicates that the heat of solution of bromine and iodine is practically independent of temperature within this temperature range and that, in the case of the chlorine, the heat of solution varies appreciably with the temperature throughout the range studied.

The molecular heats of solution of iodine, and bromine, in the region where the heat of solution is practically independent of temperature, were calculated by means of the formula,

$$\text{Log } C_2 - \text{Log } C_1 = \frac{Q}{4.581}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$$

C_1 and C_2 are the concentrations, respectively, at temperatures T_1 and T_2. Q is the heat absorbed, or $-Q$ is equal to the heat of solution. It is assumed that Q remains constant within this temperature range, a condition which is fairly well satisfied in the case of the iodine and bromine. The molecular heat of solution for bromine thus calculated was -4700 calories and for iodine -5940 calories. The molecular heat of solution of chlorine was calculated by the same formula, choosing for T_1 and T_2 20° and 40.5° (Q is not independent of the temperature in this region) and found to be 5200 calories.

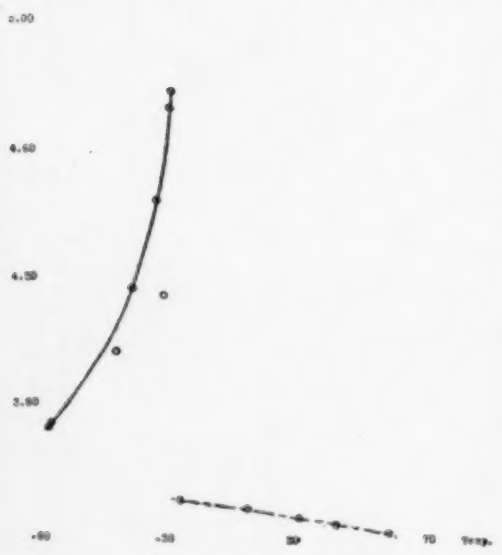

Fig. 3.— —— Bromine (unbroken line). – – – Chlorine (broken line). – · – · – Iodine (dots and dashes).

The fact that bromine and iodine give a negative heat of solution and chlorine a positive value is accounted for in that heat is required to sublime the iodine and bromine while heat is given off when the chlorine gas is condensed.

Hildebrand and Jenks (4) report the solubilities of iodine in heptane to be 0.6176, 1.702, 2.491 and 4.196 Gm. per 100 Gm. of solution at 0.0°, 25.0°, 35.0° and 50.0°, respectively. When Figs. 1 and 3 are greatly enlarged, the solubilities of iodine per 100 Gm. of solution were computed by interpolation to be 0.66 Gm. at 0°, 1.71 Gm. at 25°, 2.39 Gm. at 35° and 4.06 Gm. at 50°.

TABLE I.—SOLUBILITY OF CHLORINE IN HEPTANE AT DIFFERENT TEMPERATURES.

No. (A).	Temperature (B).	Gm. Cl Diss. in 100 Cc. Sol. (C).	Average (D).	Gm. HCl Found in 100 Cc. Sol. (E).
1	−23.0	29.50	..	..
2	−19.0	32.90	32.9	2.0
3	−12.0	15.50	Omit	..
4	−11.0	25.90	25.9	0.13
5	0.0	11.60	..	0.12
6	0.0	13.61	..	0.44

7	0.0	16.95	..	0.38
8	0.0	19.60	17.9	1.05
9	0.0	17.48		0.61
10	0.0	17.39	..	0.99
11	1.0	10.41	..	..
12	11.0	4.80	..	2.87
13	11.0	9.74	..	1.66
14	11.0	11.97	12.00	0.77
15	20.0	3.66	..	..
16	20.0	3.97	..	..
17	20.0	10.11	10.1	0.23
18	30.0	6.14	..	..
19	30.0	7.70	7.7	0.18
20	40.0	5.00	..	..
21	40.0	5.88	5.4	..
22	40.0	5.26	..	..
23	40.5	5.60	5.6	0.15
24	60.0	3.30	..	0.37
25	60.0	2.57	3.17	0.14
26	60.0	3.65	..	0.14
27	61.0	2.95	2.95	..
28	76.0	2.25	2.25	0.03
29	77.0	1.79	1.79	0.15
30	85.0	1.65	1.65	..

SUPPLEMENT TO TABLE I.—CALCULATION BASED ON TABLE NO. I.

Temperature (A).	1/T (Absolute) (B).	Gm. Cl per 100 Cc. of Sol. (C).	Log Conc. (C).
−19.0	0.003937	32.9	1.5172
−11.0	0.003817	25.9	1.4133
0.0	0.003663	17.9	1.2529
11.0	0.003520	12.0	1.0792
20.0	0.003413	10.1	1.0043
30.0	0.003300	7.7	0.8865
40.0	0.003195	5.4	0.7324
40.5	0.003188	5.6	0.7482
60.0	0.003003	3.17	0.5011
61.0	0.002993	2.95	0.4698
76.0	0.002865	2.25	0.3522
77.0	0.002857	1.79	0.2529
85.0	0.002793	1.65	0.2175

TABLE II.—SOLUBILITY OF BROMINE IN HEPTANE AT DIFFERENT TEMPERATURES.

Temperature.	1/T (Absolute).	Gm. Br in 100 Cc. of Sol.	Log of Conc.
−27.0	0.004067	36.12	1.5578
−39.0	0.004272	20.17	1.3046
−44.5	0.004376	16.12	1.2073
−33.5	0.004176	25.89	1.4130
−26.0	0.004049	36.85	1.5663
−30.5	0.004124	30.08	1.4783
−57.5	0.004641	8.88	0.9484
−56.5	0.004619	9.41	0.9736
−54.0	0.004566	10.06	1.0025
−49.0	0.004464	12.22	1.0871
−15.5	0.003874	66.53	1.8230
−12.0	0.003832	83.49	1.9216

−67.0	0.004854	4.84	0.6848
−69.0	0.004902	4.65	0.6675
−66.0	0.004831	5.43	0.7348
−59.0	0.004673	7.05	0.8482
−75.0	0.005050	3.22	0.5079
−17.5	0.003914	57.99	1.7634

TABLE III.—SOLUBILITY OF IODINE IN HEPTANE AT DIFFERENT TEMPERATURES

Temperature.	1/T (Absolute).	Gm. I in 100 Cc. of Solution.	Log of Conc.
−21.0	0.003972	0.16	−0.7959
−18.0	0.003922	0.22	−0.6576
0.0	0.003660	0.46	−0.3372
1.0	0.003650	0.48	−0.3088
20.0	0.003410	1.01	0.0043
40.0	0.003195	1.93	0.2856
60.0	0.003003	3.85	0.5855
78.0	0.002849	7.79	0.8915
20.0	0.003413	1.00	0.0000

While working with these solutions, it seemed desirable to ascertain something of their reactibility with other elements. In making comparisons, it should be borne in mind that the iodine solution, because of the sparing solubility of this halogen, was but one-fifth as strong, as to molecular equivalent, as were the two other solutions. Moreover, it will also become apparent from some of the reactions to be reported, that the solutions of chlorine and bromine contained some of their hydrides as well, resulting from the action of these halogens on heptane in spite of the precautions taken.

Of the elements of the first group, lithium, sodium and copper (foil) were used. The chlorine and bromine solutions yielded bubbles with both lithium and sodium, indicating the presence of hydrogen chloride and of hydrogen bromide in the respective solutions. After standing over night, the halogen had disappeared completely or nearly so. When a freshly prepared solution of chlorine in heptane, saturated at considerably below 0°, was added to finely powdered copper the two elements reacted with the phenomenon of flame. Upon repeating the experiment with the solution which had been kept in an ice bath for several hours, no such phenomenon occurred. The disappearance of the color of the chlorine showed that it had reacted with the solvent.

The phenomenon of flame is produced when chlorine gas is brought in contact with phosphorus, copper, boron and silicon in powder form. As has been shown, chlorine in heptane solution produces like phenomena with red phosphorus and powdered copper.

The effect of chlorine hydrate upon red phosphorus and powdered copper was also tried, but with negative effect so far as the phenomenon of flame was concerned.

Of the elements of the second group, calcium (lumps), magnesium (turnings), cadmium (lumps) and lead (powder) were tried. Calcium yielded bubbles with Cl and Br, indicating the presence of HCl and HBr, respectively. Mg and Cd apparently were affected but little by Cl. The other two elements seemed to have no effect. Pb decolorized the solutions of all three halogens.

Of the elements of Group three, Al (ribbon) only was tried. With Cl bubbles

were produced. Br and I produced a brown, tar-like deposit. The I also produced fumes of HI.

Of the elements of the fifth group, P, Sb and Bi were used. With Cl the P burst into flame immediately as stated in connection with copper. The bromine solution was decolorized the next morning, the I sol. was partly decolorized. Sb decolorized the Cl solution immediately, the Br solution was almost colorless the next morning, the I solution partly decolorized. Bi did not seem to react.

In several instances colorless crystals were obtained (NaCl, NaBr, $SbCl_3$), in other instances the bright surface of the metallic element was dulled (in the bromine experiment the Cu became black), in still other instances a tar-like product was deposited ($AlBr_3$).

It may be of interest to note that of the metallic elements sodium appeared more reactive than lithium, and cadmium more than zinc. On the other hand in Group five, P was much more reactive than Sb and Bi. Also, that, with the possible exception of Cu, the order of reactibility of the halogens proved to be Cl, Br, I, as was to be expected.

* For earlier reports see:

No. 1, JOUR. A. PH. A., 9, 857 (1920). No. 2, *Ibid.*, 9, 860 (1920). No. 3, *Ibid.*, 11, 1042, 1153 (1922). No. 4, *Ibid.*, 10, 26 (1921). No. 5, *Ibid.*, 11, 995 (1922).

(1) The principal object was the isolation and identification of the aldehydes. See P. A. Foote, JOUR. A. PH. A., 18, 350 (1929). After shaking out the aldehydes with aqueous sodium acid sulphite from the fractions with a higher boiling point than that of heptane, a complex mixture was obtained. This was fractionated by C. Sondern (*Thesis*, U-W. 1928). Of the fractions thus obtained those marked E. VII and VIII were employed.

(2) Fractions E. VII (b. p. 94.0–94.5°; d = 0.6800 at 25°) and E. VIII (b. p. 94.5–95.0°; d = 0.6815 at 25.5°) of Sondern, obtained by refractionating the portion of the oil distilling immediately above the boiling point of heptane, were used.

(3) Taylor and Hildebrand, *J. A. C. S.*, 45, 682 (1923).

(4) Hildebrand and Jenks, *Ibid.*, 42, 2180 (1920).

THERAPEUTIC SUBSTANCES DERIVED FROM UNSYMMETRICAL DIPHENYL COMPOUNDS III. SOME ARYL ESTERS OF THE HYDROXY DIPHENYLS.*

BY S. E. HARRIS AND W. G. CHRISTIANSEN.[1]

Numerous references have appeared in the literature describing the use of aryl esters of phenol and cresols as urinary and intestinal antiseptics. In extending our survey of diphenyl compounds it was decided to prepare a number of aryl esters of 2-, 3- and 4-hydroxy-diphenyls and some of their substitution products.

The three hydroxy diphenyls, (*o*-, *m*- and *p*-phenyl-phenol) and their alkyl and halogen substitution products are active, non-toxic germicides and it was hoped that by oral administration in the form of an ester they might reach the urine unmetabolized, and there exert the required germicidal action. Fifteen esters were prepared and tested. Results of animal experiments definitely show that they possessed no value as urinary antiseptics.

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* Scientific Section, A. PH. A., Washington meeting, 1934.

[1] Research Department of the Chemical and Pharmaceutical Laboratories, E. R. Squibb and Sons, Brooklyn, N. Y.

The tests were carried out upon rabbits, to which the esters, dissolved in olive oil, at a dose level of 20 mg./Kg., were administered orally twice daily for five or six consecutive days. The urine was collected from the second day on and examined for germicidal activity, following in general the procedure of Leonard (1) except that the samples were diluted as required and plated for count immediately after culture, and after 24 hours' contact.

Early results led to the belief that some of the esters possessed activity, but it was later discovered that the urine of the animals varied in activity, and in many cases the urine of untreated controls was germicidal. The variations were correlated with the diet and p_H of the urine, and in later work the p_H was adjusted to 6.5–7.5 (quinhydrone electrode). The effect of p_H adjustment upon the germicidal results is shown in the following tables. 63 urine specimens were collected from rabbits which had been on a uniform diet of hay and oats for some time.

I. p_H Distribution

p_H	Below 6.5	6.5–7.5	Above 7.5
No. of urine specimens	23	16	24

II. Tested against *B. coli* and *Staphylococcus aureus*.

(*a*) p_H Below 6.5 6.5–7.5 Above 7.5

	No. of Specimens Tested.	No. Showing Germicidal Activity.	No. of Specimens Tested.	No. Showing Germicidal Activity.	No. of Specimens Tested.	No. Showing Germicidal Activity.
B. Coli	21	8	14	1	22	13
Staph.	21	4	14	1	22	17

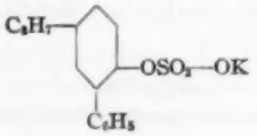
(*b*) p_H Below 6.0 Above 8.0

	No. of Specimens Tested.	No. Showing Germicidal Activity.	No. of Specimens Tested.	No. Showing Germicidal Activity.
B. Coli	8	4	18	14
Staph.	8	3	18	16

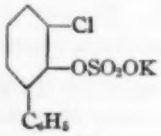
18 normal urine specimens with p_H below 6.5 or above 7.5 were then adjusted by NaOH or HCl to a value between 6.5 and 7.5. None of these adjusted samples showed any germicidal or antiseptic activity against the test organisms.

Further tests of the esters, in which the p_H of the urine samples was adjusted before test, confirmed the statement made above that the esters were not of value as urinary antiseptics.

Therapeutic activity was expected to result from liberation of the free phenol by hydrolysis of the esters in the body. Phenols, while sometimes excreted in part as glycuronates or even unchanged, are usually metabolized by the potassium salt of their acid sulphuric esters (2). These esters are stable in alkaline but not in acid solutions. The acid sulphuric esters of two of the most active phenols: Potassium 4-*n*-propyl-2-phenyl-phenyl sulphate (I) and Potassium 6-chloro-2-phenyl-phenyl sulphate (II) were prepared, tested *in vitro* and were found to be quite inactive.



I.



II.

In an alkaline or neutral urine such salts as these would represent the condition of phenol, whereas the free phenol would be expected in an acid urine. The absence of germicidal action in acid urines seems to indicate that the esters are not excreted after hydrolysis and combination with sulphuric acid, but that they pass through without material change.

In planning the work which has been outlined, we included one compound not of the diphenyl series: the benzoate of 5,7-dichloro-8-hydroxy-quinoline. It is here included for purposes of record.

EXPERIMENTAL.

The several compounds, with their corresponding crystallizing media, their melting points and analyses, are listed in the accompanying table. The esters were prepared by several methods, an example of each being detailed below. Excellent yields were obtained.

1. SCHOTTEN-BAUMANN METHODS.

3-Phenyl-Phenyl Benzoate.—42 Gm. *m*-phenyl-phenol, 43 Gm. benzoyl chloride and 50 cc. 35 per cent sodium hydroxide were mixed with 150 cc. water and shaken mechanically until the odor of benzoyl chloride had disappeared. The precipitated ester was filtered off, washed with water and dissolved in alcohol. Upon spontaneous evaporation of the alcohol the ester was deposited in fine crystals, m. p. 57–58° C. (corr.).

2. ACTION OF ACID CHLORIDE ON THE PHENOL IN A SOLVENT.

2-Phenyl-4-Chlorophenyl Benzoate.—40 Gm. 2-phenyl-4-chlorophenol and 30 Gm. benzoyl chloride were dissolved in 200 cc. toluene and refluxed until the evolution of hydrochloric acid ceased. The solution was cooled and washed with dilute sodium hydroxide and water. After drying with anhydrous calcium chloride the toluene was removed under reduced pressure and the residue crystallized from methyl alcohol, m. p. 88.5° C. (corr.).

3. ACTION OF ACID CHLORIDE ON THE PHENOL IN BENZENE WITH POTASSIUM CARBONATE.

5,7-Dichloro-8-Hydroxy-Quinoline Benzoate.—25 Gm. 5,7-dichloro-8-hydroxyquinoline, 17 Gm. benzoyl chloride and 50 Gm. anhydrous potassium carbonate (100 mesh) were dissolved in 250 cc. benzene. The mixture was refluxed and stirred for five hours. It was then treated for one-half hour with decolorizing carbon and filtered from excess potassium carbonate and potassium chloride. The precipitate was washed with hot benzene and the filtrate and washings combined. They were then washed with 5 per cent sodium hydroxide and with water and dried with calcium chloride. The solvent was distilled off and the residue recrystallized from alcohol, m. p. 129.5–130.5° C. (corr.).

4. REACTION BETWEEN THE ACID CHLORIDE AND THE PHENOL IN PYRIDINE.

2-Phenyl-Phenyl Acetyl-Salicylate.—14.7 Gm. 2-phenyl-phenyl salicylate were dissolved in 12 Gm. dry pyridine by the aid of heat and the solution cooled in an ice bath. To the resulting suspension 5 Gm. acetyl chloride were added dropwise and the reaction completed by warming on the water-bath for thirty minutes. The mixture was then poured upon ice and the resulting sticky product washed with water. It was recrystallized from alcohol until constant m. p. was reached. Consistently low yields of about 40% were obtained.

5. ACID, PHENOL AND PHOSPHORUS TRICHLORIDE OR PHOSPHORUS OXYCHLORIDE IN TOLUENE.

2-Phenyl-Phenyl Benzoate.—0.2 mol 2-phenyl-phenol and 0.2 mol benzoic acid were dissolved in 400 cc. toluene and heated under reflux. The solution was stirred mechanically to promote even boiling. 0.1 mol phosphorus oxychloride was added slowly and the refluxing and stirring continued until evolution of hydrochloric acid ceased. (This varied from three to eight

hours in various cases.) The solution was then cooled, decanted from the phosphoric acid, and washed with dilute sodium hydroxide and with water. After drying with calcium chloride the toluene was removed under reduced pressure and the residue crystallized from methyl alcohol as prisms, m. p. 75° C.

Preparation of Potassium 4-n-Propyl-2-Phenyl-Phenyl Sulphate.—16 Gm. pyridine were dissolved in 100 cc. carbon bisulphide and the solution cooled in an ice bath. 12 Gm. chlorosulphonic acid were added with good stirring during ten minutes. There was formed a crystalline precipitate of the double compound of pyridine and chlorosulphonic acid. 21 Gm. of 4-*n*-propyl-2-phenyl-phenol in an equal volume of carbon bisulphide were then added all at once. After heating for one hour on the steam-bath the carbon bisulphide was distilled off and 10 per cent potassium hydroxide added until strongly alkaline to litmus. The solution was then concentrated and allowed to crystallize. The crystals were washed with ice-cold water and then with alcohol and dried *in vacuo*. The yellow crystalline powder was readily soluble in water and slightly soluble in cold alcohol. It decomposed without melting at 180–190° C.

Preparation of Potassium 6-Chloro-2-Phenyl-Phenyl Sulphate.—This salt was prepared by the method described for the corresponding propyl compound. It formed a yellowish white crystalline powder which decomposed on heating.

Both of these sulphuric esters in water gave practically neutral solutions which slowly developed alkalinity upon standing.

Ester.	Crystallized from.	M. P., ° C. (Corrected).	Sought.	Analysis Found.	Calculated.
2-Phenyl-phenol					
Benzoate	Methyl alcohol	75–76	C	82.8	83.2
			H	5.10	5.11
Salicylate	Alcohol	91–92	C	78.1	78.6
			H	4.80	4.83
Cinnamate	Alcohol	103–104	C	83.7	84.0
			H	5.29	5.33
β-Resorcylate	Alcohol	185–186	C	74.6	74.7
			H	4.8	4.8
Acetyl Salicylate	Methyl alcohol	71.5–72.5	C	75.0	75.9
			H	4.82	4.83
3-Phenyl-phenol					
Benzoate	Alcohol	57–58	C	81.4	83.2
			H	5.11	5.11
4-Phenyl-phenol					
Benzoate	Benzene	148.5–149.5	C	83.0	83.2
			H	5.16	5.11
6-Chloro-2-phenyl-phenol					
Benzoate	Alcohol	86–87	Cl	11.68	11.51
Salicylate	Methyl alcohol	107	Cl	10.77	10.94
Cinnamate	Methyl alcohol	74.5–75	Cl	10.52	10.61
4-Chloro-2-phenyl-phenol					
Benzoate	Methyl alcohol	88.5	Cl	11.14	11.51
4-Bromo-2-phenyl-phenol					
Benzoate	Uncrystallizable oil	....	Br	22.77	22.64
x-Chloro-3-phenyl-phenol					
Benzoate	Uncrystallized thick oil	....	Cl	11.38	11.51
2-Chloro-4-phenyl-phenol					
Benzoate	Alcohol	110–111	Cl	11.26	11.51

4-n-Propyl-2-phenyl-phenol					
Benzoate	Petroleum ether	96	C	84.2	83.5
			H	6.35	6.33
Cinnamate	Petroleum ether	72.5	C	84.7	84.2
			H	6.39	6.44
5,7-Dichloro-8-hydroxyquinoline					
Benzoate	Alcohol	129.5–130.5	Cl	22.09	22.33
K salt of 4-n-propyl-2-phenyl-phenyl hydrogen sulphate	Water	Decomposes 180–190	S	9.07	9.69
K salt of 6-chloro-2-phenyl-phenyl hydrogen sulphate	Water	Decomposes 225–230	S Cl	9.80 10.29	9.92 10.98

The biological tests on compounds reported herein were made in the Biological Research Laboratories of E. R. Squibb and Sons and we gratefully acknowledge their assistance.

SUMMARY.

A number of esters of the three phenols and some of their substitution products were prepared and shown to have no value as urinary antiseptics.

REFERENCES.

(1) Leonard, V., *J. A. M. A.*, 83, 2005 (1925).
(2) Baumann, *Ber.*, 9, 55 (1876).

SALIVA TESTS. III. DETECTING THE ADMINISTRATION OF SOME OPIUM DERIVATIVES TO HORSES.*

BY JAMES C. MUNCH.[1]

Previous papers in this series (1, 2) report the development of a method for detecting morphine and heroin in the saliva of horses after the subcutaneous or intramuscular injection of known drugs (that is, the investigators knew that the horses had received morphine or heroin at the time tests upon mice were conducted).

TABLE I.—THRESHOLDS FOR MOUSE TESTS WITH OPIUM ALKALOIDS.

Product.	Mg./Kg.	10. Med. 70%. Effective Dose. Gamma/20-Gm. Mouse.
Morphine	4.00	80
Codeine	3.00	60
Dionine	1.00	20
Dilaudid	0.6	12
Heroin	0.05	1

The normal salivas collected from over one hundred untreated horses have been injected into mice; in no instance has an effect been observed resembling that produced by the opium alkaloids. The solution obtained by dissolving morphine or heroin in such a saliva, or in normal horse serum, produced the same effects

* Scientific Section A. PH. A., Washington meeting, 1935.

[1] Sharp and Dohme, Philadelphia, Penna.

upon mice as the same concentration in water. The quantities of these drugs producing definite symptoms in seventy per cent of the injected mice (ten or more mice being used on each dose) are given in Table I. In making critical tests, each mouse should be scrutinized before use, as we have found some normal mice tending to show some (but never all) of the symptoms produced by the opium alkaloids. Unless this precaution is taken, misleading results may be obtained.

Since the "doping" of race horses is not permitted by Racing Commissions, it seemed advisable to conduct a series of experiments similating race-track conditions. Twenty horses were injected subcutaneously with colorless solutions, the composition of which was unknown to the investigators. Gelatin capsules, whose contents were unknown, were administered by mouth to seventeen horses. The general procedure outlined in the first paper of this series was followed:

The saliva was collected from each horse immediately before injection or administration, and at definite intervals afterward (15, 30, 45, 60, 90 and 120 minutes, and sometimes 3 hours and 24 hours). In some instances 1/4 grain of arecoline hydrobromide was administered or injected. This facilitated the collection of saliva, but did not influence the results of the test.

The mouth of the horse was not drenched or washed, but every effort was made to obtain undiluted saliva. The opening of a 5-cc. vial was brought in immediate contact with the gingival margins, cheeks and tongue, and the thick slime obtained directly. When the contents were not sufficiently fluid, 1 cc. of distilled water was added to each vial and thoroughly shaken with the slime. A volume of 0.5 to 1 cc. was then injected into one or more mice weighing about 20 Gm.

TABLE II.—SPECIFICITY OF MOUSE TESTS FOR DETECTION OF "DOPED" HORSES.
DRUG SOLUTIONS INJECTED SUBCUTANEOUSLY.

Horse No.	Weight Kg.	Veterinary Deductions.	Deductions from Mouse Tests. Horse Treated.	Size Dose.	Treatment of Horse. Product Injected.	Dose Injected. Mg./Horse.	Gamma/Kg.
339	560	Excitable	No	...	Water	...	...
372	455	Normal	No	...	Water	...	...
341	455	Normal	Yes	Small	Morphine	100	220
340	520	Excited	Yes	Large	Morphine	200	380
380	465	Normal	Yes	Small	Heroin	2	4
379	450	Excited	Yes	Large ?	Heroin	4	9
371	445	Normal	Yes	Large ?	Heroin	6	13
342	435	Normal	Yes	Small ?	Heroin	6.5	15
343	430	Excited	Yes	Large	Heroin	6.5	15
347	420	Refractory	Yes	Large	Heroin	15	36
346	475	Very excited	Yes	Large	Heroin	50	105
377	480	Normal	Yes	Small	Codeine	25	50
378	495	Normal	Yes	Large ?	Codeine	100	200
374	410	Normal	Yes	Large	Codeine	200	490
375	445	Normal	Yes	Small	Dilaudid	2	5
370	455	Stimulated	Yes	Large ?	Dilaudid	4	9
382	465	Stimulated	Yes	Large	Dilaudid	6	13
349	445	Stimulated	Yes	Large	Dilaudid	10	22
352	510	Stimulated	Yes	Large	Dilaudid	40	79
345	455	Stimulated	Yes	Large	Dilaudid	100	220

The effects upon the mice were noted over a period of half an hour, although positive reactions usually developed within ten to twenty minutes. In some instances injected mice died over night, but no relation could be established between death and the drug administered. In some tests, in which the saliva was obtained by swabbing the horse's mouth, and diluting to approximately

300 cc. with water, unsatisfactory results were obtained; the amounts of the active substances in the saliva had been too greatly diluted. Such samples must be concentrated by suitable chemical methods before testing.

The solutions and the capsules were prepared by a member of the laboratory (A. Q.) and given code numbers. This worker retained the code and took no part in the administration or mouse testing. Based upon our observations upon mice, an attempt was made to answer two questions: (1) Do the mouse tests on the salivas from a horse suggest that the animal has been "doped?" (2) If "doped," was a large or a small amount of drug administered?

After we recorded our opinions as to "doping" and dose, contact was reëstablished with A. Q. and the code consulted for the first time. The detailed data of these tests are given in Tables II and III.

TABLE III.—SPECIFICITY OF MOUSE TESTS FOR DETECTION OF "DOPED" HORSES. DRUG ADMINISTERED IN GELATINE CAPSULES.

Horse No.	Weight Kg.	Veterinary Deductions.	Deductions from Mouse Tests. Treated.	Deductions from Mouse Tests. Size Dose.	Treatment of Horse. Product Administered.	Dose Given. Total (Mg.).	Dose Given. Gamma/Kg.
9681	400	Normal	No	....	Water	..	..
342	435	Normal	No	....	Water	..	..
343	425	Normal	No	....	Water	..	..
9960	475	Uneasy	Yes	Large	Morphine	100	210
369	415	Slight stimulation	Yes	Large	Morphine	65	158
381	425	Normal	Yes	Small	Heroin	2	5
373	415	Normal	Yes	Small	Heroin	5	12
141	445	Restless	Yes	Large	Heroin	10	22
376	450	Normal ?	Yes	Large	Codeine	65	145
366	450	Stimulated ?	Yes	Large	Dilaudid	2	4
365	460	Stimulated	Yes	Large	Dilaudid	5	11
9609	470	Restless	Yes	Medium	Dilaudid	10	21
9925	490	Stimulated	Yes	Small	Pantopon	10	20
368	435	Stimulated ?	Yes	Medium	Pantopon	10	23
367	460	Stimulated	Yes	Medium	Opium-gran.	650	1415
9851	370	Normal ?	Yes	Large	Opium-gran.	1000	2720
9988	405	Quiet	Yes	Large	Opium-gum.	1000	2475

The results obtained in making tests on the saliva of twenty horses which were injected with unknown solutions are given in Table II. It will be observed that the opinions of the veterinarians were not always in agreement with the subsequent information in indicating whether a horse had or had not been "doped." The mouse tests were correct in every instance, in showing whether a horse had or had not been "doped," and also in suggesting whether a large or a small dose had been administered. In the case of heroin and Dilaudid, the smallest doses injected were 2 mg. per horse. These doses correspond to the single doses of these drugs administered to humans. It will be noted that the veterinarians were unable to observe any evidence of abnormality in these horses.

Through the courtesy of Jervis Spencer of the Maryland Racing Commission, and of Doctors W. B. D. Penniman and T. A. Ladson, we obtained samples of saliva collected from a Maryland race horse, using the customary race-track pro-

cedure: the horse's mouth was washed with water, the gauze and gloves being added to the washings and the entire collection made up to about 300 cc. with distilled water. Samples of saliva were obtained 30 and 45 minutes after administering 10 grains of morphine sulphate in a gelatine capsule: the horse was galloped for about two miles, and saliva samples collected approximately one hour and one and one-half hours after administration. The injection of 1 cc. of each sample as collected produced a positive reaction when tested on May 14th, or the day after the saliva had been collected. These saliva samples were stored in a refrigerator and retested with the same positive results after one week, and after two months. Since the horse was known to have received morphine sulphate, the results are not included in Table III. The veterinarian was unable to observe any abnormalities in this horse, nor could the jockey detect any differences in his behavior.

Based upon this test, the experiments recorded in Table III were undertaken. Veterinary observations were not always indices of the treatment accorded the horses. The mouse test was again correct in each instance in answering the question whether a horse had or had not been "doped." Morphine appeared to be somewhat more potent than the corresponding dose of opium. Pantopon was moderately effective.

Our studies are being continued in an attempt to detect characteristic symptoms for each of these products, and some success has already been attained. We do not feel justified at this time in asserting, based *solely* upon these mouse tests, which of these opium derivatives was given to a horse. However, we do feel that a positive mouse test would justify the time, labor and expense of a chemical search. Chemical tests of the saliva may be able to identify these products.

CONCLUSION.

1. Mouse tests upon the undiluted salivas collected from 37 horses correctly showed, in every instance, whether the horse had or had not received an opium derivative (opium, morphine, heroin, codeine, Dilaudid or Pantopon).

2. Present information does not permit identification of the specific product administered in all cases. Characteristic symptoms for such identification are being sought.

FOOT-NOTE: Through the courtesy of Commissioner of Narcotics H. J. Anslinger, supplies of morphine, heroin, Pantopon and opium were made available for this investigation. Dilaudid was purchased on the open market. The technical assistance of Arnold Quici in the preparation of these solutions and capsules, and Dr. J. C. Horner, Dr. W. A. Paxson, Robert Moore, Harry J. Pratt and Aaron B. Sloane in the administration of these drugs, the collection of saliva and the conduct of the mouse tests is gratefully acknowledged.

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(1) Munch, J. C., "Saliva Tests I. Morphine," JOUR A. PH. A., 23, 766 (1934).
(2) Munch, J. C., "Saliva Tests II. Heroin," *Ibid.*, 23, 1185 (1934).

THE ASSAY OF NATIONAL FORMULARY PREPARATIONS CONTAINING BISMUTH.*

BY GLENN L. JENKINS AND SYLVIA MILLETT.[1]

Glycerite of Bismuth is the only bismuth preparation in the National Formulary for which a tolerance and assay are now official. The present study was undertaken to determine whether the method of assay employed for the glycerite could be applied to the determination of the bismuth content of Solution of Bismuth, Elixir of Bismuth, Elixir of Pepsin and Bismuth and Elixir of Pepsin, Bismuth and Strychnine, and also to determine whether other methods might be applied advantageously to the assay of these preparations.

Various methods have been utilized for the quantitative determination of bismuth, namely: the official sulphide method (1) which is known to be accurate; the formaldehyde method (2) which is not suitable since the procedure does not separate other metals commonly present as impurity; the electrolytic method (3) which is not further considered since electrolytic methods in general have been deleted from the eleventh revision of the United States Pharmacopœia; and methods based on the precipitation of bismuth as the phosphate. Moser (4) reported that the phosphate process is the most advantageous method of estimating bismuth since bismuth phosphate, $BiPO_4$, is of definite composition; it forms a white, heavy crystalline precipitate which is insoluble in water and very dilute nitric acid, it deposits and filters quickly, it is not changed by ignition, and it is not readily reduced. This method was further studied by Stahler and Scharfenberg (5), Salkowski (6), Stahler (7) and Schoeller and Waterhouse (8). Schoeller and Waterhouse critically reviewed much of the earlier investigator's findings. Working with pure bismuth nitrate solutions, they concluded that the quantitative precipitation of the phosphate was a matter of rather delicate adjustment; if the acidity was low, the liquid on being heated usually deposited a heavy crystalline precipitate of oxynitrate; and if the acidity was higher than necessary to prevent deposition of oxynitrate, a small fraction of the bismuth failed to precipitate as phosphate unless an excessive quantity of alkaline phosphate was added. Mayer (9) recommended a phosphate method for the assay of bismuth without giving experimental data to indicate the accuracy of the procedure.

In the present investigation, a comparative experimental study of the official sulphide method, of the Mayer phosphate method and of the Schoeller and Waterhouse phosphate method was undertaken. The procedures followed were: (1) That of the National Formulary V for Glycerite of Bismuth in the sulphide method. (2) The Mayer phosphate method which is as follows:

"Accurately measure 5 cc. of Glycerite of Bismuth into a 400-cc. beaker, add about 100 cc. of water, heat to boiling, then add concentrated hydrochloric acid until the precipitate which at first forms redissolves and then add ammonia water until a turbidity is produced, after which sufficient concentrated hydrochloric acid is added to clear up the turbidity; to this boiling solution

* Abstracted in part from a thesis submitted by Sylvia Millett to the Graduate School of the University of Maryland in partial fulfilment of the requirements for the Degree of Master of Science.

[1] Alumni Scholar, University of Maryland, School of Pharmacy, 1933–1934.

add an excess (about 50 cc. should be sufficient) of ten per cent ammonium phosphate solution drop by drop from a 50-cc. pipette. Allow to settle and filter the precipitate on a Gooch crucible and wash with hot water until free from chlorides and after drying crucible and contents, place in a nickel crucible and heat until the weight is constant.

"Multiply the weight of the precipitate by 0.7663 and then by 20, the result will be the grams of Bi_2O_3 in 100 cc. of sample."

(3) The Schoeller and Waterhouse phosphate method modified to adapt it to use with the official bismuth preparations as follows:

Accurately measure a portion of the preparation representing about 0.5 Gm. of Bi, dilute the solution to about 100 cc. with distilled water, and carefully add ammonia water until a slight permanent precipitate is formed. The precipitate formed in cold solution is not the crystalline oxynitrate but a flocculent basic nitrate which dissolves on the addition of nitric acid. Add 2 cc. of nitric acid, heat the solution to boiling and precipitate the bismuth while the solution is boiling by adding a 10 per cent solution of diammonium phosphate. The addition of ammonium phosphate should be made very slowly at first (preferably from a burette at the rate of about 30 drops per minute) and with constant stirring to favor the formation of a coarsely grained precipitate. When no more precipitate forms, the remainder of the precipitant may be added rapidly. A considerable excess of the ammonium phosphate solution should be used; about 60 cc. of 10 per cent solution for each 0.5 Gm. of bismuth was found to be best. After adding the precipitant, dilute the solution to 400 cc., digest the solution on a water-bath for 20 to 30 minutes, and decant the supernatant liquid through a Gooch crucible. Wash the precipitate twice with a hot 3 per cent solution of ammonium nitrate containing 0.5 cc. of nitric acid per liter, wash the precipitate into the crucible, dry and ignite gently. Each Gm. of $BiPO_4$ is equivalent to 0.6865 Gm. of Bi.

This procedure entirely obviates the formation of crystalline oxynitrate caused by deficiency of nitric acid, while the subsequent dilution of the liquid reduces the concentration of the nitric acid so that all of the bismuth is precipitated as phosphate.

ASSAY OF GLYCERITE OF BISMUTH.

Two samples of Glycerite of Bismuth prepared by the method of the National Formulary V were assayed by the three methods. Five-cc. samples of the glycerite were accurately measured from a pipette calibrated to contain 5 cc. and the glycerite adhering to the wall of the pipette was washed out with distilled water. The results given in the following table are expressed in terms of per cent Bi W/V.

TABLE I.—ASSAY OF GLYCERITE OF BISMUTH.

Method.	Analyst A. Sample 1.	Analyst A. Sample 2.	Analyst B. Sample 1.	Analyst B. Sample 2.
Sulphide	14.33, 14.77	12.35, 12.48	14.36, 14.40	12.45, 12.52
Mayer phosphate	14.29, 14.32	12.43, 14.47	14.38, 14.35	12.50, 12.46
Schoeller Waterhouse phosphate	14.69, 14.68	12.90, 12.60	14.60, 14.42	12.78, 12.82

The results show that the sulphide and the Mayer phosphate methods yield equally accurate and comparable results and that the Schoeller Waterhouse phosphate method yields slightly high results. Consequently, the Schoeller Waterhouse phosphate method was eliminated and further study was limited to the sulphide and Mayer phosphate methods. Samples of solution of bismuth, elixir of bismuth, elixir of pepsin and bismuth and of elixir of pepsin, bismuth and strychnine were prepared from the respective glycerites and assayed with results as follows:

TABLE II.

Preparation and Method.	Analyst A. Sample 1.	Analyst A. Sample 2.	Analyst B. Sample 1.	Analyst B. Sample 2.
Solution of Bismuth				
Sulphide	1.83, 1.79	1.61, 1.59	1.78, 1.80	1.57, 1.64
Mayer phosphate	1.81, 1.75	1.60, 1.63	1.83, 1.86	1.54, 1.58
Calculated	1.80	1.60	1.80	1.60
Elixir of Bismuth				
Sulphide	1.78, 1.79	1.58, 1.59	1.79, 1.80	1.62, 1.60
Mayer phosphate	1.81, 1.80	1.61, 1.60	1.82, 1.82	1.61, 1.60
Calculated	1.80	1.60	1.80	1.60
Elixir of Pepsin and Bismuth				
Sulphide	1.81, 1.80	1.59, 1.59	1.79, 1.79	1.61, 1.60
Mayer phosphate	1.78, 1.79	1.58, 1.57	1.78, 1.80	1.58, 1.59
Calculated	1.80	1.60	1.80	1.60
Elixir of Pepsin, Bismuth and Strychnine				
Sulphide	1.83, 1.79	1.61, 1.62	1.82, 1.80	1.63, 1.59
Mayer phosphate	1.81, 1.78	1.60, 1.58	1.78, 1.79	1.57, 1.58
Calculated	1.80	1.60	1.80	1.60

SUMMARY AND CONCLUSIONS.

1. A comparative study has been made of the accuracy of the sulphide, Mayer phosphate and Schoeller Waterhouse phosphate methods of estimating bismuth in bismuth containing liquid preparations of the National Formulary.

2. The Schoeller Waterhouse phosphate method does not yield accurate results when applied to these preparations.

3. Either the sulphide method or the Mayer phosphate method yields accurate and comparable results when applied to the glycerite, solution or elixirs of bismuth.

4. Since the Mayer phosphate method is simple and accurate, it might advantageously replace the sulphide method now official for the assay of glycerite of bismuth and be made official for the assay of the solution and elixirs containing bismuth.

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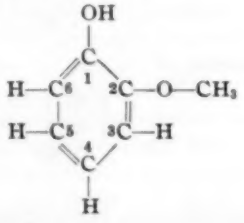
POTASSIUM GUAIACOL SULPHONATE.*

BY A. H. CLARK AND ERNST KIRCH.

For several years potassium guaiacol sulphonate has been used as a medicament in the treatment of those conditions in which guaiacol is indicated. Since it is a very stable compound, as all aromatic sulphonates are, its use may be looked upon as irrational but it is popularly believed to be absorbed as an entire molecule and in this way acts as does guaiacol. Be this as it may it is very widely used, especially as a syrup, and its manufacture and sale is a commercial enterprise of considerable importance.

There are several guaiacol sulphonic acids and their salts possible from a theoretical standpoint and some of these have been described. Guaiacol, the basic substance, has the following structure:



If the carbon atoms of the ring are numbered as above it is seen that four guaiacol sulphonic acids are possible, namely the 1,2,3, the 1,2,4, the 1,2,5 and the 1,2,6. From each one of these acids, as well as by replacement of the hydrogen in the OH group, or in both ways at once, salts may be formed. Several guaiacol sulphonates are thus possible. The only ones of importance in which we are interested at the present time are those in which the metal enters the sulphonic acid group since the presence of the potassium in the OH group is incidental only.

Much confusion in the nomenclature of these salts is occasioned by different writers using such terms as ortho, meta, para, viscinal, alpha, etc., to indicate the position of the three substituents in the benzene ring. It is not always clear whether the OH or the OCH_3 group is the basic one used and it is evident that two viscinal compounds are possible. To avoid all confusion in the following discussion the system of numbering as given above will be used throughout and even the terms used by others will be translated into this system when it is possible to do so.

The questions that prompted this investigation are: Is there any difference in therapeutic activity between the four possible salts? If so, which one is the most active? If any one is more active than the others how may it be distinguished from the others? What is the product commonly sold? When it is considered that many pharmaceutical houses market potassium guaiacol sulphonate without any statement as to what it is, the importance of a correct answer to these questions is obvious.

Search of the available literature reveals no records of painstaking pharmacological work on this substance. From its very nature it might be assumed to liberate guaiacol with difficulty and therefore have no value unless it is absorbed as

* University of Illinois, College of Pharmacy, Chicago, Ill.

an entire molecule. Fränkel (1) states that the 1,2,4 compound has no value while the 1,2,6 has. May (2) states that the 1,2,3 compound is therapeutically useful and that the 1,2,4 has no value. Barrowcliff and Carr (3) state that it is important the salt should be free from the 1,2,4 compound. Fourneau (4) states that Thiocol is the 1,2,6 compound. Rosenthaler (5) states that Thiocol is 1,2,6 and that the 1,2,4 is not to be employed. Evers (6) states that potassium guaiacol sulphonate is the salt of the 1,2,5 acid.

In this connection some value may be attached to the fact that the following authorities recognize the 1,2,6 compound, specifically mentioning it in their descriptions which would indicate preference over the others. New and Nonofficial Remedies of the A. M. A., all editions from 1918 to 1934, inclusive; Svenska Farmakopen, 1925; Pharmacopœa Hungarica, IV, 1934; British Pharmaceutical Codex, 1934; Deutsches Arzneibuch, Prior to 1926; Merck's Index, IV, 1930.

Other authorities described it as follows: Pharmacopœa Helvetica, V, 1933, as a mixture of 1,2,4 and 1,2,5; Deutsches Arzneibuch 1926 as a mixture of 1,2,4 and 1,2,5; Pharmacopea Jugoslavica 1933 as 1,2,5.

The first to give attention to guaiacol sulphonic acid or potassium guaiacol sulphonate seems to have been Tiemann and Koppe (7) but Barell (8) was the first to make any study of its structure. He thought that he had made the 1,2,6 acid. This conclusion seems to be incorrect in the light of later and very thorough work which is ably presented by Paul (9). The latter showed that by sulphonating guaiacol below 100° C. a mixture of the 1,2,4 and 1,2,5 acids is formed. Rising (10) studied the subject about the same time and published the results of his work a little later. He concludes that the 1,2,4 and the 1,2,5 acids are readily prepared at temperatures below 100° C., most readily at 70° C. If the temperature is 135–140° C. he claimed to have prepared a so-called viscinal acid, either the 1,2,3 or the 1,2,6. These various acids were studied, their potassium salts described and other facts recorded. He concluded that the marketed products at that time were mixtures of the 1,2,4, the 1,2,5 and some of the basic salt, that is potassium replacing the hydrogen in the OH group.

Paul (11) published a second paper in which he disagreed with some of Rising's conclusions, holding that the latter's viscinal compound, the 1,2,3 or 1,2,6 was in reality $C_6H_3(OH)(OH)HSO_3$ 1,2,4 and offers evidence to support this stand. It is significant that Rising did not publish any comment on this criticism. At this point the matter rested for about twenty years until Rupp and Brixen (12) published the results of much work done on these products and also pharmaceutical preparations made from them.

From these sources the answers to the last two questions asked in the beginning of this discussion are obtained. With the exception of Barell's work the conclusion is that the products marketed up to 1926 were mixtures of the 1,2,4 and the 1,2,5 compounds with small varying amounts of the basic one. No investigator has shown that any marketed product consisted, even in a small degree of the 1,2,6 compound and it seems certain that it never has been made. We have examined samples of potassium guaiacol sulphonate from seven different sources in addition to Thiocol and every one of them is substantially the same in every way and when examined by the methods used by the authors referred to above are found to be a mixture of the 1,2,4 and 1,2,5 salts.

The tests, data, etc., upon which this conclusion is based are summarized in the following statements.

Physically all samples were about the same. Colorless crystalline powders, odorless, of a faintly bitter taste, and a neutral or slightly alkaline reaction to litmus. Marked alkalinity indicates basic character, *i. e.*, some of the H in the OH group replaced.

The melting points of the free acids obtained from samples prepared directly from guaiacol were 96–97° C. for the 1,2,4 and 106.5–107.5° C. for the 1,2,5. The same acids prepared from Thiocol gave 96.5–97.3° C. and 106.5–107.5° C. and from one commercial sample, acids isolated gave 96.5–97.5° C. and 106–107.5° C. The figures given by Rising (10) are 97–98° C. and 106–108° C. Since all other samples were alike in other respects no further melting point determinations were made.

Every sample gave dinitroguaiacol the melting point of which varied between 121.5° and 122° C., indicating according to Rupp and Brixen (12) the presence of the 1,2,4 compound. The figure given by Mulliken (13) for this compound is 122° C. The following four reactions are the same as used by Rupp and Brixen.

Ferric chloride gave a blue coloration with every one of our samples.

Lead acetate precipitates the 1,2,4 acid but not the 1,2,5 and all samples behaved alike with this reagent.

Lead subacetate precipitates both the 1,2,4 and the 1,2,5 acids and with those samples on which this test was tried precipitates were obtained.

Ammonia water and calcium chloride precipitate with the 1,2,4 acid but not with the 1,2,5. This was the case with those samples on which the test was used.

Upon coupling with diazobenzene as directed by Rising both the 1,2,4 and the 1,2,5 compounds give an orange-red coloration but no precipitate. This coloration was given by all our samples.

The solubility in water is of some interest since the 1,2,5 salt is much more soluble than the 1,2,4. All our samples were freely soluble and all about alike. From a careful observation all samples examined contained about 75% of the 1,2,4 and 25% 1,2,5.

Rising claimed that his viscinal compound, the 1,2,6 or 1,2,3 as he stated it to be, gave a green color with ferric chloride, a purple color with lead acetate, a precipitate only after standing with lead subacetate and brown flakes with diazobenzene. Since no sample examined by us gave any of these reactions, not one of them contained what Rising thought to be the 1,2,6 compound.

CONCLUSIONS.

This study has brought out the following facts about potassium guaiacol sulphonate.

1. That the evidence supporting the belief that the 1,2,6 compound is the most valuable from a therapeutic standpoint or that the 1,2,4 is valueless or harmful, is very slight and practically worthless.
2. That the 1,2,6 compound never has been made.
3. That all market products are alike, eight of them having been examined by us.
4. That since the 1,2,6 compound does not exist and the market products are all alike no tests can at present be suggested to distinguish one product from another

unless some manufacturer begins to separate the 1,2,4 from the 1,2,5 and markets a single salt in place of the mixture or some one actually makes the 1,2,6 compound.

5. That the proportion of the 1,2,4 to the 1,2,5 is approximately 3 to 1.

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A COMPARATIVE STUDY OF ENTERIC COATINGS.[1]

BY F. S. BUKEY AND PHYLLIS RHODES.[2,3]

The authors in a previous study of enteric coatings found a wide variation in the efficiency of the coating materials. It was, therefore, decided to test various types of commercial coatings. Several of the pharmaceutical manufacturers agreed to coöperate in this study by applying their enteric coatings on tablets of barium sulphate.

Five different enteric coatings were submitted by the manufacturers for this study. Among these types were two of keratin, one salol-shellac, one shellac and one composed of a mixture of salol and resins. In every case the products submitted were finished and in external appearance resembled any sugar-coated tablet. The uncoated tablets measured 10.5 mm. in diameter and 4.8 mm. in thickness. In addition to the tablets, one manufacturer supplied enteric and sugar-coated No. 1 capsules filled with barium sulphate.

The subjects for these experiments were picked from the student body and in every case normal individuals in apparent good health. The X-ray was used to determine the exact point of disintegration. In general, the following procedure was used in making this study. Each subject was given a certain number of tablets followed at once with a glass of water containing a teaspoonful of Bari-o-meal. The Bari-o-meal was sufficient to outline the stomach, but did not produce a density great enough to mask the tablets. The first radiograph was usually taken after 30 minutes and others followed at desired intervals until disintegration occurred.

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[1] Section on Practical Pharmacy and Dispensing, A. PH. A., Washington meeting, 1934.

[2] Fellow of the Smith Dorsey Co., Lincoln, Nebr.

[3] College of Pharmacy, University of Nebraska, Lincoln, Nebraska.

The results of this study have been tabulated into groups according to the type of coating. The chart gives the number of tablets taken, the time at which they were taken and the point and time of disintegration.

Kind of Coating.	Subject.	Number of Tablets Taken.	Time of Taking.	Point and Time of Disintegration.
Keratin No. 1	No. 1	3	4:30 P.M.	3, stomach, 45 min.
	No. 2	3	4:30 P.M.	3, stomach, 45 min.
	No. 3	3	7:40 P.M.	3, stomach, 60 min.
	No. 4	3	7:40 P.M.	3, stomach, 80 min.
	No. 5	3	7:40 P.M.	3, stomach, 80 min.
	No. 6	3	8:10 P.M.	1, stomach, 45 min. 2, stomach, 60 min.
	No. 7	3	8:10 P.M.	1, stomach, 45 min. 2, stomach, 60 min.
	No. 8	3	8:10 P.M.	2, stomach, 60 min 1, stomach, 80 min.
	No. 9	3	8:10 P.M.	3, stomach, 80 min.
Keratin No. 2	No. 1	4	10:00 A.M.	1, ascending colon, 6 hrs. 30 min. 2, descending colon, 10 hrs. 20 min. 1, pelvic colon, 10 hrs. 20 min.
	No. 2	4	9:00 A.M.	2, ascending colon, 11 hrs. NOTE: Two were in the stomach at the end of 13 hrs., point of disintegration not determined.
	No. 3	4	9:30 A.M.	1, small intestine, 10 hrs. 30 min. 3, small intestine, 12 hrs. 30 min.
	No. 4	4	9:00 A.M.	3, ascending colon, 12 hrs. 1, transverse colon, 24 hrs.
	No. 5	4	1:40 P.M.	1, stomach, 9 hrs. 10 min. 1, pelvic colon, 17 hrs. NOTE: The point of disintegration of 2 tablets was unknown.
	No. 6	4	1:40 P.M.	2, descending colon, 17 hrs. NOTE: The point of disintegration of 2 tablets was unknown.
	No. 7	4	7:00 A.M.	3 were excreted in 29 hrs. NOTE: The point of disintegration of 1 tablet was unknown.
Shellac (3 coats)	No. 1	3	1:30 P.M.	3, stomach, 3 hrs.
	No. 2	3	1:30 P.M.	3, stomach, 3 hrs.
	No. 3	3	6:30 P.M.	3, stomach, 1 hr.
	No. 4	3	1:45 P.M.	3, stomach, 1 hr. 20 min.
	No. 5	3	1:45 P.M.	1, stomach, 1 hr. 25 min. 2, stomach, 2 hrs.
	No. 6	3	1:45 P.M.	1, stomach, 1 hr. 30 min. 2, stomach, 2 hrs. 5 min.
	No. 7	3	2:00 P.M.	3, stomach, 1 hr. 40 min.
	No. 8	3	2:00 P.M.	3, stomach, 1 hr. 20 min.
Salol and gum resin mixture	No. 1	3	11:00 A.M.	1, small intestine, 5 hrs. 10 min. 1, stomach, 7 hrs. 1, small intestine, 7 hrs.
	No. 2	3	12:30 P.M.	1, stomach, 3 hrs. 30 min. 1, stomach, 5 hrs. 30 min. 1, small intestine, 6 hrs. 30 min.

	No. 3	3	12:30 P.M.	1, stomach, 3 hrs. 30 min. 1, stomach, 4 hrs. 30 min. 1, stomach, 6 hrs. 30 min.
	No. 4	3	3:00 P.M.	1, stomach, 4 hrs. 1, small intestine, 4 hrs. NOTE: The point of disintegration of one was not determined. It was still in the stomach at the end of 7 hrs.
	No. 5	3	3:00 P.M.	1, small intestine, 4 hrs. 1, small intestine, 5 hrs. NOTE: The point of disintegration of one was not determined. It was still in the stomach at the end of 7 hrs.
	No. 6	3	11:00 A.M.	1, small intestine, 4 hrs. 30 min. 2, small intestine, 5 hrs. 30 min.
	No. 7	3	11:00 A.M.	1, stomach, 5 hrs. 30 min. NOTE: The point of disintegration of two was not determined. They were still in the stomach at the end of 6 hrs. 30 min.
	No. 8	3	12:30 P.M.	2, stomach, 4 hrs. 1, stomach, 5 hrs.
	No. 9	3	4:00 P.M.	1, small intestine, 4 hrs. 2, small intestine, 5 hrs.
	No. 10	1	4:00 P.M.	1, small intestine, 4 hrs.
	No. 11	3	4:00 P.M.	1, small intestine, 4 hrs. 2, small intestine, 5 hrs.
	No. 12	3	4:00 P.M.	1, small intestine, 5 hrs. 2, small intestine, 6 hrs.
	No. 13	3	5:15 P.M.	1, stomach, 5 hrs. 1, stomach, 6 hrs. NOTE: The point of disintegration of one was unknown. It was still in the small intestine at the end of 7 hrs.
	No. 14	3	5:15 P.M.	1, stomach, 3 hrs. 2, small intestine, 6 hrs.
Salol-shellac	No. 1	2 T 2 C	11:00 A.M.	1 capsule, stomach, 2 hrs. 30 min. 1 capsule, small intestine, 5 hrs. 30 min. 2 tablets, small intestine, 6 hrs. 30 min.
	No. 2	2 T 2 C	11:00 A.M.	1 capsule, small intestine, 2 hrs. 30 min. NOTE: The point of disintegration of one capsule was unknown. 2 tablets, stomach, 5 hrs. 45 min.
	No. 3	2 C 2 T	11:00 A.M.	1 capsule, stomach, 6 hrs. 1 capsule, stomach, 8 hrs. 2 tablets, stomach, 8 hrs.
	No. 4	2 C 2 T	12:45 P.M.	2 capsules, stomach, 5 hrs. 15 min. 2 tablets, small intestine, 8 hrs. 30 min.
	No. 5	2 C 2 T	10:00 A.M.	NOTE: The point of disintegration of 2 capsules was not known. 1 tablet, small intestine, 6 hrs. 1 tablet, small intestine, 7 hrs.
	No. 6	2 C 2 T	11:00 A.M.	2 capsules, small intestine, 3 hrs. 1 tablet, small intestine, 4 hrs. 45 min. 1 tablet, small intestine, 6 hrs.

It is evident from the data obtained that there is about as much variation in the commercial coatings, as in those prepared in the laboratory. On considering the keratin coating No. 1, we find total disintegration in the stomach, the average time being about one hour. These tablets are of no value for enteric medication. From experience we have had with keratin as an enteric coating we concluded that the adverse results were caused by a faulty method of application. The results of the experiments for keratin No. 2, showed that 13 tablets disintegrated in the colon, 4 in the small intestine, and 1 in the stomach. The point of disintegration of 7 was unknown, and 3 were excreted. This coating proved to be 80.95% efficient. In making this calculation for the various coatings, results were disregarded in all cases where the exact point of disintegration was unknown. The results from the keratin No. 2 coating indicate an exceptionally good enteric coating. The experiments for the shellac coating show that these tablets are of no value for enteric medication. The average time for disintegration was between 70 and 100 minutes. Faulty application cannot be claimed for this coating as other tablets purchased on the market disintegrated in about the same average time. In the case of the salol resin mixture, 13 tablets disintegrated in the stomach and 22 tablets in the intestine. Five tablets had not disintegrated when the last picture was taken, and their fate was not determined. This enteric coating was 63.00% efficient. The results of the experiments using salol shellac showed that 8 tablets disintegrated in the small intestine and 4 in the stomach. Four capsules disintegrated in the small intestine and 5 in the stomach. The fate of 3 capsules was not determined. The average time of disintegration for the tablets was 6 hours and of the capsules was 4 hours. The percentage efficiency of the tablets was 66.66% and of the capsules was 44.44%. In this case, it appears that the tablets are a better means of medication than the capsules.

It may be concluded that none of the enteric coatings studied was perfect. The best results would seem to be obtained with keratin when properly applied. However, if one considered the absorption rate of the colon less than that of the small intestine, the salol mixtures would be better. Capsules with the same type of enteric coating as a tablet are not as efficient, due no doubt to mechanical difficulties as the capsules roll thin on the ends during the coating process. Shellac by itself is of no value as an enteric coating.

The authors wish to thank the Abbott Laboratories Inc., North Chicago, Ill., G. D. Searle Co., Chicago, Ill., Sharp and Dohme Co., Baltimore, Md., and the Smith Dorsey Co., Lincoln, Nebr., for their coöperation in coating tablets for this study. The authors also wish to thank the students of the College of Pharmacy, University of Nebraska, for their assistance as subjects in this study.

ENTERIC COATINGS. I. A LABORATORY METHOD FOR THE STUDY AND CONTROL OF ENTERIC COATINGS.*

BY MILTON WRUBLE.

Several years ago a preliminary report on enteric coatings was made by the writer (1). Since that time the opportunity has presented itself to study the prob-

* The Research Laboratories, The Upjohn Company, Kalamazoo, Michigan. (June 26, 1935.)

lem more intensively and in a more comprehensive manner because of the availability of apparatus and working facilities.

p_H of Gastric and Intestinal Juices.—The normal acidity of the gastric juice due to the free hydrochloric acid present ranges from about p_H 1.6 to p_H 1.8. However, it usually varies over a much wider range.

Vanzant, Alvarez, Eusterman, Dunn and Berkson (2) have studied the gastric acidity of 3746 persons in whom careful examination did not reveal any disease which could perceivably affect the mucous membrane or the secretory activity of the stomach.

They found a steady increase in the incidence of achlorhydria from youth to old age and that free gastric acidity appears to increase rapidly from childhood to the age of 20 years when adult values are reached. They also found that about the age of puberty, the average value for boys begins to rise considerably above that for girls.

Boldyreff (3), who has made extensive investigations in this field, has proved that in the normal organism during digestion, as well as in the empty stomach, the acidity of the gastric contents is mainly regulated by the alkali of the pancreatic juice regurgitated from the duodenum into the stomach.

He has further shown (4) that the entrance of duodenal secretions into the stomach occurs, as a purely physiological phenomenon, (*a*) when the stomach and duodenum are empty, (*b*) with abundance of acid in these organs, (*c*) with abundance of fat in these organs and with any strong irritation of the duodenal mucosa caused by hot or cold liquids, alcohol, etc.

Much evidence has been presented within recent years to show that in the human small intestine the reactions may vary from distinctly acid to slightly alkaline. Long and Fenger (5) have made an important contribution in this direction.

Howell makes the following statement (6): "The secretions emptying into the small intestine, the succus entericus, the bile and the pancreatic juice, all have a slightly alkaline reaction and we should expect, therefore, to find the reaction of the intestinal contents on the alkaline side. Most observers have reported, however, that during digestion the reaction of the contents is acid."

Recent work with dogs by Bollman and Mann at the Mayo Clinic (7) has shown that during digestion the reaction in the duodenum may vary between p_H 3.8 and p_H 6.6. In the jejunum they found the reaction to be on the acid side. In the ileum they observed that even during digestion the reaction did not drop below the neutral point p_H 7.0.

Temperature.—Hepburn, Eberhard, Ricketts and Rieger (8) measured temperatures in the gastrointestinal tract with a recording thermometer. In a group of 257 healthy, active individuals the gastric temperature was between 97.5 and 102.2° F. In a group of 53 subjects the temperature of the upper part of the intestine lay between 98° and 100.1° F.

The ingestion of either ice water or ice cream produced marked decrease in gastric temperature, followed by a rise, at first quite rapid, then progressively slower. The average recovery time exceeded one-half hour. The use of ice water in a test-meal was found to delay the gastric emptying time by from 15 to 30 minutes.

The authors obtained evidence that leakage of a cold beverage through the pylorus lowers the temperature of the upper part of the intestine by several degrees. This observation may throw light on the etiology of the gastroenteric disturbances in patients who have a rapid emptying time and partake copiously of cold beverages.

The ingestion of hot coffee produced a marked increase in gastric temperatures followed by a decrease, at first rapid then progressively slower.

Motility or Emptying Rate of Stomach.—The peristaltic activity of the healthy stomach begins shortly after the ingestion of the meal, but its advent may be retarded or even inhibited by nervous states and emotions.

The motility of the stomach depends on several factors. The average emptying rate in patients without obstructive lesions lies between three and five hours. Briggs (9) made such a study with 100 normal individuals employing the barium meal. He obtained the following figures: The stomach emptied in two and a half hours in 1 per cent; in three hours in 6 per cent; in three and a half hours in 9 per cent; in four hours in 44 per cent; in four and a half hours in 32 per cent and in five hours in 8 per cent.

Campbell and Conybeare (10) independently examined a group of healthy male students by means of the fractional test-meals and also radiographically. They demonstrated that hypertonus, hyperacidity and rapid emptying of a barium meal occurred most frequently in men of the broad-chested, vigorous, athletic type; hypotonus, low acidity and slow emptying for the most part in narrow-chested men below the average of physical development and not taking regular exercise.

Bukey and Brew (11) in their study of the emptying time of the stomach with reference to pills and tablets, arrived at the following conclusions:

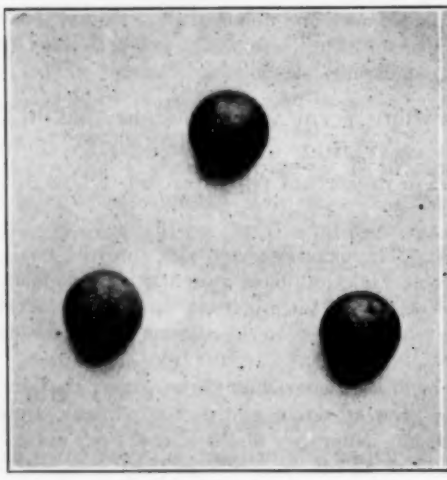

Fig. 1.

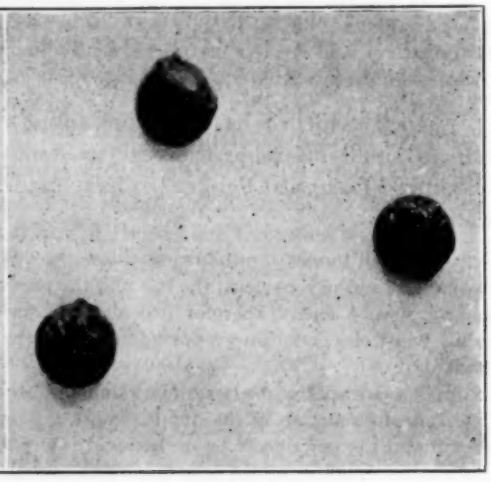

Fig. 2.

(1) The size and shape of a pill, tablet or capsule have no effect on the length of time it will remain in the stomach.

(2) The same individual does not react uniformly toward this type of medication with reference to emptying time.

(3) Emptying time may be influenced by diet.

(4) The type of coating does not have any effect on the length of time that pills, tablets and capsules will remain in the stomach.

Motility may be impaired or exaggerated by disease. Abnormal rapid emptying or hypermotility occurs in a certain proportion of cases of duodenal ulcer with hypertonus.

EXPERIMENTAL.

The actual *in vitro* study of enteric coatings may be conveniently carried out in an apparatus in which the tablets are allowed to rotate in buffers covering the gastric and intestinal ranges at temperatures between 37.5° to 40° C. The apparatus employed (12) was a modification of a type used in earlier investigations in this field. The disintegration point was observed in each case.

While it is true that such a mechanical test can be but a mere approach to the actual picture of conditions in the stomachs and intestines of individuals of widely varying characteristics, still it has been possible to establish a relationship in this manner and thus such a procedure has been of real value in the laboratory study and control of enteric coatings.

Hundreds of tablets and capsules have been studied as described, in this laboratory. From the numerous observations made it is significant to note that in every case the coating surface of the tablets immersed in buffers from p_H 1.2 to p_H 6.4 showed little change even after rotating for eight hours or more while those immersed in buffers beginning with p_H 6.4 and upward showed evidence of attack and a definite shriveling effect within 5 to 15 minutes. See Figs. 1 and 2.

Examination of the latter tablets indicates that the enteric coating has permitted the passage of fluids through it by becoming permeable while in the other case the coating has remained entirely impervious even after many hours of rotation and contact.

DISCUSSION.

Recent investigations have definitely indicated that our earlier notions regarding the acidity and alkalinity of the stomach and small intestines, respectively, are erroneous. More often the small intestine is slightly acid in reaction and the p_H of the stomach will doubtless vary over a considerable range because of regurgitation and the other factors already enumerated.

In addition, therefore, to the requisite physical and chemical properties that a coating must possess and the fact that it must be physiologically inert, it must also resist the wide and variable acid range in the stomach and commence to disintegrate at the slightly acid reaction found in the small intestine. If a coating requires a decidedly alkaline reaction before disintegration commences, the tablet or capsule will in all probability pass through the small intestine without disintegration taking place.

CONCLUSIONS.

1. A laboratory method for the study and control of enteric coating has been described.
2. The extreme sensitivity of this coating in buffers is noted.

REFERENCES.

(1) Wruble, M., "Enteric Coatings," *Am. J. Pharm.*, 102, 318 (1930).

(2) Vanzant, F. R., Alvarez, W. C., Eusterman, G. B., Dunn, H. L., Berkson, J., "The Normal Range of Gastric Acidity from Youth to Old Age," *Arch. Int. Med.*, 49, 345 (1932).

(3) Boldyreff, W. N., "The Self-Regulation of the Acidity of the Gastric Contents," *Bull. Battle Creek Sanit. and Hosp. Clinic*, 22, 65 (1927); *Ibid.*, 24, 379 (1929).

(4) *Ibid.*, 24, 392 (1929).

(5) Long, J. H., and Fenger, F., "On the Normal Reaction of the Intestinal Tract," *J. Am. Chem. Soc.*, 39, 1278 (1917).

> "In the human small intestine the reaction may vary from distinctly acid to slightly alkaline on the part which may be reached by the Rehfus tube where the tube is far enough down to secure a uniform mixture of contents. The acid reaction is apparently as common as the alkaline, but the degree of acidity is not sufficient to check the tryptic digestion, which in some instances seems to be favored by a reaction on the acid side of neutrality. The reaction found must vary with the state of diges-

tive acidity and is simply an equilibrium condition between the chyme and the alkaline juices poured into the duodenum. Any reaction near neutrality may obtain."

(6) "Textbook of Physiology," 11th Edition, page 829.

(7) *Mayo Clinic Proceedings*, May 12, 1930, from Howell, 11th Edition, page 829.

(8) Hepburn, J. S., Eberhard, H. M., Ricketts, R., Rieger, C. L. W., "Temperature of the Gastrointestinal Tract," *Arch. Int. Med.*, 52, 603 (1933).

(9) Ryle, J. A., "Gastric Function in Health and Disease," 23 (1926).

(10) *Ibid.*, page 19.

(11) Bukey, F. S., Brew, M., "A Study of the Emptying Time of the Stomach with Reference to Pills and Tablets," JOUR. A. PH. A., 23, 1217 (1934).

(12) Wruble, M., "Enteric Coatings," *Am. J. Pharm.*, 102, 318 (1930).

(*To be continued.*)

AN UNUSUAL MORTAR AND PESTLE.*

BY JOHN E. KRAMER.[1]

In one of the museum cases of the Philadelphia College of Pharmacy and Science there is an unusual mortar and pestle attracting the attention of even the most casual passer-by. The mortar is made of bronze, $6\frac{1}{2}$ inches high, 5 inches in diameter at the bottom and 6 inches across the top. Two handles, one projecting from either side, about half way up from the bottom, are the first things to catch the eye. Further inspection reveals a band across the mortar bearing the inscription "NAPOLEON-EMPEREUR." Immediately the investigating spirit is aroused, and close scrutiny reveals a smaller band running around the top with the words "A Besancon Bieillemand-Pharmacien-Drogiste" cast in the band. Between these bands can be seen wreaths and eagles, alternating, and in the space between the lower band and the bottom of the piece, emblems of two figures facing each other and more wreaths alternate.

A Monarch's Mortar.

The pestle is also of bronze and is $9\frac{1}{2}$ inches long. Through the center it is $1\frac{1}{2}$ inches in diameter but at the ends the diameter reaches $3\frac{3}{4}$ inches. There appear two imperial shields and eagles and the inscription "Anno 1802." These pieces were presented to the College by Dr. David Costelo of New York.

It was just one year after the date on this pestle that the Pharmaceutical Society was founded in Paris. And it was in 1804 that Napoleon, at the beginning of his greatest bid for fame, secured a popular vote changing France to an empire, and secured for himself the title of Emperor of France. Evidently, with the acquisition of this new title, Napoleon had all his belongings stamped accordingly, hence the band around the middle of the mortar.

The royal courts of those days had, by appointment, doctors, druggists and others to satisfy the various needs of the emperors and their retinues. Bieillemand was the favored pharmacist at this time and used this mortar in which to mix the potions and pill masses for the great Corsican and his court. The position was no

* Section on Historical Pharmacy, A. PH. A., Toronto meeting, 1932.

[1] Philadelphia College of Pharmacy and Science.

sinecure, for, where the master went a-warring, his appointed servitors followed in his wake, the physician and the pharmacist no doubt being among the most valuable in the party.

The years 1802 to 1805 were peaceful years for Napoleon. The Treaty of Amiens, in 1802, had put France at peace with the world for the first time in ten years. But Napoleon's interference with the affairs of other countries brought an early end to this tranquility in international relationships and to the comparative ease of Bieillemand's appointment.

War broke out again in 1805, resulting in the defeat of the Austrians and the Russians by Napoleon at Austerlitz on December 2nd. On October 14, 1806, he defeated the Prussians at Jena and on June 14, 1807, he defeated the Russians at Friedland.

This was an eventful period in the life of France and Napoleon, and, co-incidently, in the life of Bieillemand. Many were the campaigns of the Emperor and long and hard were the voyages. Sometime in the midst of these campaigns, about 1808, records show that Napoleon appointed Charles Louis Cadet de Gassicourt his personal pharmacist, and we have, then, but six years in which to give this mortar and pestle credit for active life in His Majesty's service. Just how many places they went, and how many medicines they helped mix can be told only by the pieces themselves. Silently they stand now, ever to be a source of wonder and much conjecture.

THE SIR HENRY S. WELLCOME MEDAL AND PRIZE.

COMPETITION FOR 1935.

The competition is open to all medical department officers, former such officers, Acting Assistant and Contract Surgeons of the Army, Navy, Public Health Service, Organized Militia, U. S. Veterans' Administration, U. S. Volunteers and the Reserves of the United States, commissioned medical officers of foreign military services, and all members of the Association, except that no person shall be awarded a prize more than once in the prize competitions of the Association. All competitors who are not already members of the Association are eligible to membership, and the Executive Council of the Association hopes that they will exercise their privilege and join.

The Executive Council has decided that the Wellcome Prize for 1935 be awarded for the research work most valuable for the military service performed in any branch of medicine, surgery or sanitation, report of which is submitted in competition for the prize and has not previously been submitted for publication.

A Gold Medal (including cash prize of $500.00) will be awarded for the report of research work submitted in accordance with the above conditions which is decided by the Board of Award to be the most meritorious.

Each competitor must furnish five copies of his competitive report. The reports must not be signed with the true name of the writer, but are to be identified by a *nom de plume* or distinctive device. The reports must be forwarded to the Secretary of the Association of Military Surgeons of the United States, Army Medical Museum, Washington, D. C., so as to arrive at a date not later than August 15, 1935, and be accompanied by a sealed envelope marked on the outside with the fictitious name or device assumed by the writer and enclosing his true name, title and address. The length of the report should not exceed a maximum of 10,000 words, it being understood that tabular statements are not counted. The winning report becomes the property of the Association and will be published in the Military Surgeon. Should the Executive Council see fit to designate any paper for "first honorable mention" the writer will be awarded life membership in the Association of Military Surgeons, and his report will also become the property of the Association.—*The Military Surgeon.*

THE MICROSCOPY OF POWDERED DESICCATED ENDOCRINE GLANDS.*

(ABSTRACT.)

BY HEBER W. YOUNGKEN.

Studies have been made by the author upon the microscopy of certain powdered desiccated glands of internal secretion obtained from cattle and hogs and, in the case of the thyroid and pituitary, also from sheep with a view toward providing microscopical standards for these biological products which are being more and more employed in modern organotherapy.

Without microscopical descriptions of these products they would be prone to adulteration with undesirable materials by unscrupulous persons.

Descriptive microscopical standards are presented for powdered desiccated thyroid, suprarenal, whole pituitary, anterior pituitary, posterior pituitary, ovary, ovarian residue and corpus luteum.

Various stains and reagents have been employed in the identification of the different histological elements occurring in each and the reactions of these elements to them are discussed.

Powdered desiccated thyroid may be identified by its smooth to striated, hyaline fragments of colloid, some of which contain granules, minute vacuoles, crystalloidal bodies and cells together with the numerous, irregular fragments of follicular epithelium, both of which stain brown with a mixture of Mallory's stain and 1% solution of phosphotungstic acid.

Powdered desiccated suprarenal may be identified by its numerous, characteristically stellate to irregularly shaped chromophile (chromaffin) cells which take a brown coloration with chromic acid test solution together with its characteristic cortical cells as examined in Delafield's hematoxylin and alcoholic eosin.

Powdered desiccated whole pituitary may be identified by the numerous large, polyhedral or chromophile cells which show a coarse granulation and which show a distinct affinity for acid stains, acid fuchsin coloring them a deep red, the presence of many chromophobe cells of more or less cubical, rounded or pyriform shape with few or no fine granules whose nuclei are colored blue and cytoplasm a paler blue with either Delafield's hematoxylin or a mixture of eosin and methylene blue solution, the mossy neuroglia cells with their many, slender branching processes clearly visible in a mixture of 1% phosphotungstic acid and Delafield's hematoxylin and by the presence of bipolar nerve cells.

Powdered desiccated anterior pituitary can be identified by the presence of characteristic chromophile and chromophobe cells and the absence of mossy neuroglia and bipolar nerve cells.

Powdered desiccated posterior pituitary may be identified by the very numerous mossy neuroglia cells and bipolar and multipolar cells and the absence of chromophile and chromophobe cells.

Powdered desiccated whole ovary or "ovarian substance" is characterized by the presence of more or less distorted cubical to low columnar epithelial cells whose nuclei take a deep blue and cytoplasm a pale purple or pink color with Delafield's hematoxylin, by the rounded to irregular masses consisting of primary oocytes surrounded by connective tissue elements, the rounded to oval interstitial cells containing granules and fat droplets staining bright red with red acid dyes, the numerous fibroblasts with forked ends, the numerous lutein cells, often in masses, which appear yellowish in water mounts together with an abundance of dense connective tissue consisting mostly of narrow collagen fibres which swell and are colored yellow in a mixture of 1% picric acid and 1% acetic acid solution.

Powdered desiccated ovarian residue shows a similar microscopic picture to powdered desiccated whole ovary except for the almost complete absence of corpus luteum material.

Powdered desiccated *corpus luteum* is characterized by its numerous lutein cells, isolated or in masses, the individual cells somewhat polyhedral with spheroidal central nucleus and numerous lutein granules and fat droplets, the groups of lutein cells intermingled with fine collagen fibres and appearing yellowish or greenish yellow in water mounts.

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* Presented before Section N3, American Association for the Advancement of Science, Minneapolis meeting, June 27, 1935.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

Thirty-Sixth Annual Meeting of the

AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY.

HOTEL MULTNOMAH, PORTLAND, OREGON, AUGUST 5-6, 1935.

OFFICERS.

President, Ernest Little; *Vice-President*, Antone O. Mickelsen; *Secretary-Treasurer*, Zada M. Cooper; *Chairman of the Executive Committee*, Charles B. Jordan.

MONDAY, AUGUST 5TH.

9:00 A.M. Meeting of Executive Committee—Empire Room.

9:30 A.M. Meetings of Teachers' Conference.

Conference of Teachers of Pharmacy, Monday, August 5th, 9:30 A.M.—Junior Ball Room.

OFFICERS.

Chairman, W. G. Crockett; *Vice-Chairman*, Leon W. Richards; *Secretary*, Emery T. Motley.

Program.

A Round Table Discussion of Pharmaceutical Technique as Described in the Syllabus.

Conference of Teachers of Chemistry, Monday, August 5th, 9:30 A.M.—Club Room.

OFFICERS.

Chairman, Marion L. Jacobs; *Secretary*, John C. Bauer.

Program.

1. Instruction about Synthetics, E. V. Lynn, Discussed by—George L. Webster and Glenn L. Jenkins.
2. The Teaching of Food and Drug Analysis, C. C. Glover. Discussed by—Russel A. Cain and Frederick Grill.

Conference of Teachers of Pharmacognosy and Pharmacology—Monday, August 5th, 9:30 A.M.—Colonial Room.

OFFICERS.

Chairman, A. John Schwarz; *Secretary*, Charles E. F. Mollett.

Program.

Topics for Discussion:

1. Pharmacology: Definition and Scope of the Course for Pharmacy Majors, Frank H. Eby and H. M. Burlage.
2. Should the Term Materia Medica Be Deleted from Our Catalogs and from State Board Examinations? C. E. Mollett.
3. Should Undergraduate Students in Pharmacy Do Animal Experimentation or Should the Course Be Taught by Demonstration? F. J. Bacon.
4. Biological Assays for Undergraduate Students in Pharmacy, D. B. R. Johnson.
5. Correlation of the Courses in Pharmacology and Physiology, Dr. Van Loan.
6. Pharmacology as a Basis for Improving Relations with Physicians, B. V. Christensen.
7. Suggestions for a Course in Botany for Pharmacy Students, H. M. Wilson and Ralph Bienfang.

Paper—"A Study of the Records of the Same Class in Botany and Pharmacognosy," Marin S. Dunn.

"The British Pharmacognosy Syllabus," D. R. Bienfang.

Conference of Teachers of Pharmaceutical Economics—Monday, August 5th, 9:30 A.M.—Marine Room.

OFFICERS.

Chairman, Paul C. Olsen; *Secretary*, John F. McCloskey.

Program.

Topics for Discussion:

Trends in drug store profits 1932, 1933 and 1934.

Accounting records necessary and desirable in drug stores.

The operation of state fair trade acts for resale price control.

SESSIONS OF THE ASSOCIATION.

First Session, Monday, August 5th, 1:30 P.M.—Junior Ball Room.

Roll Call.

Appointment of Committee on Resolutions.
Address of the President, Ernest Little.
Report of the Secretary-Treasurer, Zada M. Cooper.
Report of Executive Committee, Charles B. Jordan.
Appointment of the Nominating and Auditing Committees.
Paper—"The Four-Year Course in Pharmacy," C. O. Lee and H. G. DeKay.
Reports of Standing Committees:
Committee on Educational Standards, Edward Spease.
Committee on Curriculum and Teaching Methods, Robert C. Wilson.
Committee on Activities of Students and Alumni, George C. Schicks.
Delegates to the American Council on Education, Rufus A. Lyman.

MONDAY, AUGUST 5TH, 6:00 P.M.

Annual Dinner.
Address by Dean E. H. Lauer of the University of Washington.

Second Session, Monday, August 5th, 8:00 P.M.—Junior Ball Room.

Reports of Standing Committees (*Continued*):
Committee on Relation of Boards and Colleges, D. B. R. Johnson.
Committee on Libraries, Charles O. Lee.
Committee on Problems and Plans, Rufus A. Lyman.
Papers—"Objectives and Objective Tests."
For Qualitative Analysis, H. G. DeKay.
For Organic Chemistry, C. J. Klemme.
Syllabus Committee, J. G. Beard.
Paper: "The Teaching of Bacteriology to Pharmacy Students," George F. Reddish.
Reports of Special Committees.
Committee on Student Branches of the AMERICAN PHARMACEUTICAL ASSOCIATION, George L. Webster.
Committee on the Establishment of a Pharmaceutical Corps in the Unted States Army, Townes R. Leigh.
Committee to Study List of Crude Drugs Prepared by District No. 2, Heber W. Youngken.

Joint Session of the National Association of Boards of Pharmacy and the American Association of Colleges of Pharmacy, Tuesday, August 6th, 9:00 A.M.—Assembly Hall Room.

Report of the Fairchild Scholarship Committee, E. G. Eberle.
"Examination Questions, Both College and Board Questions," A. B. Lemon.
Paper—"The Possibilities and Limitations of Coöperation between Boards of Pharmacy and Colleges of Pharmacy," Robert P. Fischelis.
Report of Recommendations or Resolutions Referred from District Meetings, D. B. R. Johnson.

Third Session, Tuesday, August 6th, 2:00 P.M.—Junior Ball Room.

Reports of Special Committees (*Continued*):
Committee on Membership Standards, A. G. DuMez.
Committee on Code Matters, W. F. Rudd.
Committee on Food and Drug Legislation, Charles B. Jordan.
Report of Committee on Resolutions.
Reports of Special Representatives:
Representative on American Council on Pharmaceutical Education, A. G. DuMez.
Reporter on Biological Abstracts, Heber W. Youngken.
Representatives to National Conference on Pharmaceutical Research, Glenn L. Jenkins.
Representatives to National Drug Trade Conference.
Representatives to the Druggists' Research Bureau, Paul C. Olsen.
Representative to the National Association of Retail Druggists, John F. McCloskey.
Report of Historian, Edward Kremers.
Unfinished Business.
Miscellaneous.
New Business.
Executive Session.

Additions, if any, will appear in Official Program and under Societies and Colleges.

Thirty-Second Annual Meeting of the

NATIONAL ASSOCIATION OF BOARDS OF PHARMACY.

HOTEL MULTNOMAH, PORTLAND, OREGON, AUGUST 5–6, 1935.

OFFICERS.

President, C. H. Evans; *Honorary President*, F. W. Hancock; *Vice-Presidents*, George Moulton, John Woodside, E. V. Zoeller, Albert Ely, Wm. Muesing, C. M. Brewer, R. C. Shultz, R. W. Fleming; *Secretary*, H. C. Christensen; *Treasurer*, J. W. Gayle.

Program.

MONDAY, AUGUST 5, AT 9:30 A.M.—FIRST SESSION.—ASSEMBLY HALL ROOM.

1. Call to Order, President C. H. Evans.
2. Roll Call.

3. Appointment of Committee on Credentials, President C. H. Evans.
4. President's Address, Charles H. Evans.
5. Appointment Committee on President's Address.
6. Report of Secretary, H. C. Christensen.
7. Report of Treasurer, J. W. Gayle.
8. Appointment of Nominating Committee, President Evans.
9. Report of Executive Committee, A. L. I. Winne, *Chairman*.
10. Presentation of Suggested Amendments to Constitution and By-Laws, L. C. Lewis, *Chairman*.

MONDAY, AUGUST 5, AT 1:30 P.M.—SECOND SESSION.—ASSEMBLY HALL ROOM.

1. Report of Advisory Examination Committee, H. C. Christensen, *Chairman*.
2. Report of Syllabus Committee.
3. Report of Legislative Committee, Mac Childs, *Chairman*.
4. Report of Committee on National Legislation, R. L. Swain, *Chairman*.
5. Report of Committee on Prerequisite, R. W. Fleming, *Chairman*.
6. Report of Publicity Committee, Rowland Jones, *Chairman*.
7. Report of Grievance Committee, W. M. Hankins, *Chairman*.
8. Report of Committee on National Certificate, H. C. Christensen, *Chairman*.
9. Report of Committee on Minimum Standards of Technical Equipment, A. C. Tayler, *Chairman*.
10. Report of Committee on Pharmaceutical Jurisprudence, Roy B. Cook, *Chairman*.
11. Report of Committee on Code Matters, R. L. Swain, *Chairman*.
12. Report of Banquet Committee, Linn E. Jones, *Chairman*.

MONDAY, AUGUST 5, AT 6:30 P.M.—N. A. B. P. BANQUET.—ASSEMBLY HALL ROOM.

Tuesday, August 6, at 9:00 A.M.—Joint Session.—Assembly Hall Room.

National Association of Boards of Pharmacy and American Association Colleges of Pharmacy—program—see page 578.

TUESDAY, AUGUST 6, AT 1:20 A.M.—FINAL SESSION.—ASSEMBLY HALL ROOM.

1. Reports of Vice-Presidents.
   District No. 1, George Moulton.
   District No. 2, John M. Woodside.
   District No. 4, Albert E. Ely.
   District No. 5, Wm. C. Muesing.
   District No. 6, Mac Childs.
   District No. 7, R. C. Shultz.
2. Report of Committee on President's Address.
3. Report of Department of Education, R. L. Swain, *Director*.
4. Report of Committee on Constitution and By-Laws, L. C. Lewis, *Chairman*.
5. Report of Resolutions Committee, A. C. Taylor, *Chairman*.
6. Report of Committee on Plaque, J. A. J. Funk, *Chairman*.
7. Reports of Special Committees.
8. Unfinished Business.
9. New Business.
10. Report of Nominating Committee.
11. Election and Installation of Officers.
12. Adjournment.

National Conference on Pharmaceutical Research, 1935 Meeting.

PORTLAND, OREGON, SATURDAY, AUGUST 3, HOTEL MULTNOMAH.

OFFICERS.

Chairman, E. N. Gathercoal; *Vice-Chairman*, William J. Husa; *Secretary*, John C. Krantz, Jr.; *Treasurer*, Fitzgerald Dunning; *Executive Committee:* H. V. Arny, R. L. Swain, F. C. Bibbins.

First Session, 2:00 P.M.

1. Call to Order by Chairman.
2. Appointment of Nominating Committee.
3. Summary of Year's Activities and Outlook of Conference for the Future, by Chairman Gathercoal.
4. Reports of Officers.
   a. Report of Secretary.
   b. Report of Treasurer.
   c. Report of Executive Committee by Secretary.
5. Reports of Standing Committees.
   (1) Physical Chemistry, Arthur Osol, *Chairman*.
   (2) Bacteriology and Immunology, Louis Gershenfeld, *Chairman*.
   (3) Pharmacognosy, Heber W. Youngken, *Chairman*.
   (4) Pharmacology and Bioassays, James C. Munch, *Chairman*.
6. Roll Call of Delegates.
7. Adjournment for dinner. Arrangements will be made for a dinner for the delegates assembled.

An address pertinent to the work of the Conference will be delivered.

Evening Session 8:00 P. M.

8. (5) Medicinal Chemicals, Joseph Rosin, *Chairman.*
   (6) Endocrinology, Arthur Grollman, *Chairman.*
   (7) Manufacturing Pharmacy, L. Wait Rising, *Chairman.*
   (8) Pharmaceutical Dispensing, William J. Husa, *Chairman.*
   (9) Educational Methods, A. B. Lemon, *Chairman.*
   (10) Pharmaceutical Economics, Harry S. Noel, *Chairman.*
   (11) Historical Pharmacy, Charles H. LaWall, *Chairman.*
9. Reports of Other Special Committees.
   (1) Publications, Edward N. Gathercoal, *Chairman.*
   (2) Census of Research, James C. Munch, *Chairman.*
10. General Discussion of the Status of Pharmaceutical Research.
11. Election and Installation of Officers.
12. Adjournment.

Thirteenth Annual Meeting
of
PLANT SCIENCE SEMINAR.

OFFICERS.

President, Frank H. Eby; *Secretary-Treasurer*, Franklin J. Bacon; *Local Secretary*, Ernst T. Stuhr.

MONDAY, JULY 29TH.

10:00 A.M. Registration at Seminar Headquarters, North Pacific College.
11:00 A.M. Report of the President.
Report of the Program Committee.
1:00 P.M. Tour of Portland Parks and Gardens of interest.

TUESDAY, JULY 30TH.

9:00 A.M. "An Economical and Safe Apparatus for Use in the Laboratory for Heating Inflammable Solvents," Mr. Bernard Melkon, Philadelphia College of Pharmacy and Science.
"Commercial Drug Plantings in Oregon," Prof. Ernst T. Stuhr, Oregon State College.
"Studies of Phytolacca. I. Morphology of Young Inflorescence," Prof. E. H. MacLaughlin, Philadelphia College of Pharmacy and Science.
"The Importance of the Library in Teaching Pharmacognosy," Prof. Frank H. Eby, Temple University.
1:00 P.M. Field Trip to the Leach Gardens.

WEDNESDAY, JULY 31ST.

9:00 A.M. "The Kilmer Memorial Garden," Dr. Marin S. Dunn, Philadelphia College of Pharmacy and Science.
"Toxicity of Certain Salts to the Growth of Penicillium Italicum," Mr. Bernard Melkon, Philadelphia College of Pharmacy and Science.
10:00 A.M. "The Cultivation of Digitalis at the Squire Valleevue Medical Plant Garden," Dr. F. J. Bacon, Western Reserve University.
Round-table Discussion on the Cultivation of Medicinal Plants.
1:00 P.M. Estacada field trip to Ginseng and Hydrastis projects.

THURSDAY, AUGUST 1ST.

8:00 A.M. Loop trip (west highway), Portland, McMinnville, Taft, Newport, Corvallis (mileage approximately 180 miles).
1:00 P.M. Tour of inspection, Oregon State College.

FRIDAY, AUGUST 2ND.

9:00 A.M. Peavy Arboretum.
1:00 P.M. Return to Portland (east highway), Corvallis, Salem, Oregon City, Portland (mileage approximately 90 miles).
8:00 P.M. Business Session of the Seminar.
Report of Committees.
Report of Secretary-Treasurer.
Election of Officers.

Mrs. Harvey W. Wiley has donated a collection of Pharmacopœial circulars and other records, PROCEEDINGS and YEAR BOOKS and other volumes, related to pharmacy, to the American Institute of Pharmacy.

The programs of the Sections and Conferences will be found under "Societies and Colleges."

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1934–1935.

June 5, 1935.

Office of the Secretary, 2215 Constitution Ave., Washington, D. C.

LETTER NO. 18.

To the Members of the Council:

97. Use of the Text of the N. F. VI. A vote is called for on Motion No. 33 (Council Letter No. 17, page 512). Voting card enclosed.

98. Tentative General Program for the Eighty-Third Meeting. At the request of its president, the scheduled dinner of the Kappa Epsilon Sorority on Thursday, August 8th, be taken from the program since this organization has no chapter on the coast.

The following letter has been received from Secretary Dargavel of the N. A. R. D.

"Thank you very much for the invitation extended to attend the Joint Meeting of the Council of the A. PH. A. and the Executive Committee of the N. A. R. D. Please be advised that we shall be very glad to accept this invitation and meet with you during your convention. There will be at least three members of the Executive Committee at your meeting."

As no further comment on the tentative program has been received, a vote on Motion No. 34 (Council Letter No. 17, page 513) is called. A voting card is enclosed and the members of the Council are requested to indicate thereon whether they prefer the meeting of the Council on Saturday, August 3rd, or on Sunday, August 4th.

June 22, 1935.

LETTER NO. 19.

To the Members of the Council:

99. Printing and Binding Recipe Book, II. At the time the contract for the printing and binding of the N. F. VI was awarded to the Mack Printing Company (see Council Letter No. 10, 1932–1933, A. PH. A. JOURNAL, August 1933, page 791) for which their bid was the lowest submitted, the revision of the Recipe Book, Second Edition, had not progressed sufficiently to justify the consideration of a contract for its manufacture. When it was recently decided to request bids for the printing and binding of R. B. II, the Mack Printing Company offered to accept the contract on the same price basis as that for the N. F. VI, with necessary increases for the higher cost of paper, higher cost of binding and electrotypes, and higher cost of printing due to the shorter run. The contract limits the edition to 10,000 copies of which only 5000 are to be bound. The sales of R. B. I have totaled about 5500 copies.

The following communication has been received from Chairman DuMez of the Committee on Publications:

"I am returning herewith the bid from the Mack Printing Company for the manufacture and sale of the Recipe Book II.

"The price basis for this bid is the same as that which the Mack Company used for the Pharmacopœia and National Formulary, except that the printing will have to be done in shorter units, which will increase the price somewhat, and there will be a slight increase in cost for paper and the cost for binding and electrotypes.

"These are legitimate increases and it is therefore, recommended that the contract be let to the Mack Printing Company."

(*Motion No. 35*) *It is moved by DuMez that the contract for printing and binding the Pharmaceutical Recipe Book be awarded to the Mack Printing Company, Easton, Penna., on the basis of their proposal of May 10, 1935.* A vote on this motion will be called for in about ten days.

100. Exemption from Taxation. On April 5, 1935, H. A. B. Dunning and E. F. Kelly attended a hearing before the Commissioners of the District of Columbia, on the petition of the ASSOCIATION for tax exemption on its property, and furnished the information requested about the ASSOCIATION and its activities. S. L. Hilton could not attend the hearing on account of illness.

The following communication has not been published earlier since it was necessary to check the re-numbering of certain lots as explained below:

COMMISSIONERS OF THE DISTRICT OF COLUMBIA
EXECUTIVE OFFICE
WASHINGTON.

A.O. 63,726 May 10, 1935.

ORDERED:

That the property of the AMERICAN PHARMACEUTICAL ASSOCIATION known as Lots 3, 4, 5, 16, 17, 801, 802, 806 and 807, Square 62, be exempted from general taxes as of January 1, 1934, and such exemption shall continue as long as said property is used for its present purposes; provided, that all taxes, interest, etc., against said property be paid to the date exemption is allowed.

By order of the Board of Commissioners, D. C.

R. M. BRENNAN,
Secretary to the Board.

Official copy furnished:
Mr. E. F. Kelly, *Secretary*, AMERICAN PHARMACEUTICAL ASSOCIATION, 2215 Constitution Ave., N. W.

On account of the closing of Water Street between 22nd and 23rd Streets and the transfer of property between the United States of America and the ASSOCIATION, in accordance with Public Resolution No. 18, signed May 1932, and as set out in Council Letter No. 3, 1932–1933, see JOURNAL, A. PH. A., Oct. 1933, pages 1058 to 1065, it became necessary to renumber certain of the lots in Square 62 as shown on the plot plan printed on page 1063.

The parts of Lots 12, 13, 14, 15 and 17 transferred to the United States as shown in red on the plan, are now numbered Lot 805. The remainder of these lots is now numbered Lot 806. The property transferred to the ASSOCIATION by the United States as shown in yellow on the plan and comprising part of the bed of Water Street and part of U. S. Reservation No. 332B, is numbered Lot 807.

The order of exemption, therefore, covers all of the property owned by the AMERICAN PHARMACEUTICAL ASSOCIATION.

Taxes on the property were paid including the first half of 1933–1934, or until March 1, 1934.

101. Applications for Membership. The following applications properly endorsed and accompanied by the first year's dues have been received:

No. 219, Dufae Lee, 447 Vine St., Clinton, Ind.; No. 220, Bertam Francis Jones, 137 Willowdale Ave., Montclair, N. J.; No. 221, Jacob Philip Beisels, 1082 Fifth Ave., North Bergen. N. J.; No. 222, William M. Dick, 80 College St., New Haven, Conn.; No. 223, Harry A. Cohon, 502 S. W. Yamhill, Portland, Ore.; No. 224, Mortimer Irvin Cobin, 1521 Bryant Ave., Bronx, N. Y. C.; No. 225, Stanley Everett Cairncross, 64 Prospect Ave., Hackensack, N. J.; No. 226, Philip Ting Fee Lam, 505 W. Ocean Ave., Long Beach, Calif.; No. 227, Roller Lynn Tooley, Central City, Nebr.; No. 228, Charles Samuel Gore, Veterans Admin., Coatesville, Penna.; No. 229, Ignatius Joseph Bellafiore, 588 Tenth St., Brooklyn, N. Y.; No. 230, Abraham H. Lee, 940 East 174th St., Bronx, N. Y. C.; No. 231, Sister M. Getulis Honorowski, 1120 N. Leavitt St., Chicago, Ill.; No. 232, Florence Marie Hatter, 5601 N. Crawford Ave., Chicago, Ill.; No. 233, Samuel Stelmah, 1796 Vyse Ave., Bronx, N. Y. C.; No. 234, Edward Aaron Bachman, 439 N. W. Broadway, Portland, Ore.; No. 235, George A. Tozer, 1608 California, Everett, Wash.; No. 236, Henry Mishkin, 5537 Maryland Ave., Chicago, Ill.; No. 237, Shelley Braverman, 271 Madison Ave., New York, N. Y.; No. 238, Paula Towle, San Francisco, Calif.; No. 239, Elsie Hambly Bennetts, 999 Thorne Ave., Fresno, Calif.; No. 240, W. Volney Bursell, 938 Villa St., Mountain

View, Calif.; No. 241, Gustave B. Faure, 325 First St., Corte Madera, Calif.; No. 242, Harold Ralph Hefner, 860 Ashberry St., San Francisco, Calif.

(*Motion No. 36*) *Vote on Applications for membership in the American Pharmaceutical Association.*

E. F. KELLY, *Secretary.*

LETTER NO. 20.

July 12, 1935.

To the Members of the Council:

102. Use of the Text of N. F. VI. Motion No. 33 (Council Letter No. 17, page 512) has been carried and Dr. Leech has been so advised.

103. General Program for the Eighty-Third Annual Meeting. Motion No. 34 (Council Letter No. 17, page 514 and Council Letter No. 18, page 581) has been carried and the general program is approved.

Preference for the date of the Council meeting in Portland is not definite as several members did not express themselves. Chairman Hilton requests that the members of the Council be advised that the meeting will be called on Saturday, August 3rd, at 10 A.M. If a quorum is not present at that time, the meeting will be called at 10 A.M., Sunday, August 4th.

104. Printing and Binding Recipe Book II. A vote is called for on Motion No. 35 (Council Letter No. 19, page 581).

105. Election of Members. A vote is called for on Motion No. 36 (Council Letter No. 19, page 583).

106. Applications for Membership. The following applications properly endorsed and accompanied by the first year's dues have been received:

No. 243, Isidore Greenberg, 124 Division Ave., Brooklyn, N. Y.; No. 244, C. A. Anderson Litchfield, Minn.; No. 245, St. Elmo Brady, Fisk University, Nashville, Tenn.; No. 246, Muriel Alice Stoner, Montana Deaconess Hospital, Great Falls, Mont.; No. 247, Anthony John Szczesiul, 16 Railroad Ave., Beacon Falls, Conn.; No. 248, David Goldstein, 734 Vermont St., Brooklyn, N. Y.; No. 249, Arthur M. Thompson, 55 Pacific St., Rockland, Mass.; No. 250, Elie J. Hudon; 11 B Moulton St., Lynn, Mass.; No. 251, Walter J. Luscinski, 36 Cottage St., Lynn, Mass., No. 252, Richard C. O'Leary, 169 Forest Ave., Brockton, Mass.; No. 253, Nicholas A. Kafalas, 7 Horton St., Newburyport, Mass.; No. 254, John C. Klein, Richardton, N. Dak.; No. 255, William V. Verbryke, 926 W. Delaware Ave., Toledo, Ohio; No. 256, Kenei Oshiro, 5838 Gregory Ave., Hollywood, Calif.; No. 257, Edward A. Bachman, 439 N. W. Broadway, Portland, Ore.; No. 258, John T. Dillon, St. Andrews Hotel, Portland, Ore.; No. 259, Arthur P. Wilson, 3416 N. E. 68th Ave., Portland, Ore.; No. 260, Thomas I. McGuire, 2007 N. E. 61st Ave., Portland, Ore.; No. 261, Frederick E. Klohn, 6914 S. E. 21st Ave., Portland, Ore.

(*Motion No. 37*) *Vote on Applicants for membership in the American Pharmaceutical Association.*

E. F. KELLY, *Secretary.*

THE FORMULARY OF THE UNIVERSITY HOSPITAL, UNIVERSITY OF MICHIGAN.

The AMERICAN PHARMACEUTICAL ASSOCIATION is indebted to Harvey A. K. Whitney, Chief Pharmacist of Ann Arbor, Mich., University Hospital, for a copy of the volume. The formulary is very conveniently arranged and serves a useful purpose, not only for the pharmacist but for the physicians who are enabled to make use of Pharmacopœial and National Formulary preparations and for pharmacists to coöperate with them in the writing of prescriptions. The book has been prepared in such a way that additional matter can be added and without disturbing the order. It is pleasing to note the care and study which has been given in arranging the book. All measures have been recorded in the metric system and internal liquid preparations have been constructed on the basis of fifteen doses. Prescriptions that generally may be ordered by title are frequently expressed in amounts on the basis of 100 so that percentage concentrations may be easily calculated. The book appeals to us as well worth while and the arrangement throughout shows the study and care which the author has given to the compilation.

EDITORIAL NOTES

SCHOOL OF PHARMACY OF OREGON STATE MONTHLY.

The *Oregon State Monthly* issued a School of Pharmacy number. The first page of the text has a picture of the American Institute of Pharmacy and of President Robert P. Fischelis. Another article relates to the convention of three state conventions to be held in Portland during A. PH. A. Convention week. Dean Adolph Ziefle speaks of pharmacy and the code of ethics and he also writes of pharmacy as a life vocation.

FEDERAL TRADE COMMISSION WRITING CODES.

The Federal Trade Commission has announced its readiness to negotiate voluntary codes. The commission is writing 170 industries and it is said there is evident disposition to maintain standards. Industries now desiring codes are instructed to file applications describing briefly their business, what is expected of codes in the way of outlawing unfair methods of competition and the representative character of those applying.

EXCISE TAX CONTINUED FOR TWO YEARS.

A new tax measure extends the excise tax for another two years and is in line with recommendation of the Ways and Means Committee to continue all present federal excise taxes two years; some additions have been made to the list of items taxed. Multiple taxation has been given consideration.

A NEW SECTION TO THE BRITISH POISONS LIST.

The Pharmaceutical Journal of May 25, 1935, states that "since the Draft Poisons List and Rules were published in *The Journal* (British) no official communication has been made by the Poisons Board, nor is it yet known when the final report will be ready. An interesting indication of what may be expected so far as one class of drugs is concerned may be seen from a remark made by Sir William Willcox, a member of the Board, when he delivered the annual oration to the Medical Society of London. After showing how a variation in the pharmacological action of barbituric compounds follows the substitution of an ethyl grouping by alkyl, phenyl or other radical, he stated that when the report of the Poisons Board was issued it would be seen that regulations are to be made limiting the supply of certain drugs of powerful therapeutic action; to medical prescription. The importance of this declaration will at once be recognized; it introduced a method of controlling the sale and supply of substances falling within the schedule similar to that in force under the Dangerous Drugs Acts. It is almost a certainty that all derivatives and compounds of barbituric acid which have been shown to possess habit-forming properties or danger from overdosage will be scheduled in this manner: public opinion, as expressed by some newspapers, has demanded it, even though it remains unmoved by the much larger number of accidental and suicidal fatalities from lysol and other cresylic disinfectants. What other drugs will in future be obtainable on prescription only we can only hazard a guess. Possibly the dinitrophenols, which ought only to be taken under the closest medical supervision, will be placed in this category, and, to judge from the authoritative opinions expressed when phenylcinchoninic acid was placed in the first part of the present Schedule of Poisons, it, too, may be found in the new section. At present, however, we can only conjecture, and, in common with all pharmacists, must await the report of the Board before knowing definitely what modification it is likely to make in our own business."

PHARMACY IN JAPAN.

The Japanese Health Bureau of the Department of Home Affairs has recently announced the number of pharmacists and physicians at the end of 1933. The total number of pharmacists is given as 21,802, classified as follows: 14,847 engaged in the preparation of medicine and in the sale of medicine; 2371 engaged in the preparation of medical preparations in hospitals and clinics; and 1323 owners or managers of dispensaries.

Tokyo has the larger number of pharmacists, numbering 5850 or 9.82 pharmacists for every 10,000 population. The total number of pharmacists throughout Japan is 3.24 pharmacists per 10,000 population.

The total number of physicians throughout Japan was given as 52,792.

PERSONAL AND NEWS ITEMS.

The Minnesota State Pharmaceutical Association presented Dean Frederick J. Wulling, in the form of an engrossed scroll, resolutions formally recognizing his distinguished work for pharmacy for a period of over fifty years beginning with March 10, 1884.

Rugnar Almin and Charles V. Netz were continued, respectively, as *chairman* and *secretary-treasurer* of the Northwestern Branch of the AMERICAN PHARMACETUICAL ASSOCIATION at the last meeting of the Branch.

Dr. Edward Kremers, head of the department of pharmacy at the University of Wisconsin since 1892, retired from that position on June 30th. He became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1887 and a regular contributor to the sections of the ASSOCIATION and father of the Section on Historical Pharmacy; he is a member of American and foreign historical societies.

Dr. Kremers is an international authority on volatile oils, member of many American and foreign pharmaceutical and chemical organizations, and author of many papers on chemistry and drugs. He has been at the University since 1890. He is the author of the English edition of Gildemaister-Hoffman-Kremers—"The Volatile Oils."

Dr. Kremers earned his Ph.D. degree at the U. of Göttingen; he graduated in Pharmacy at the University of Wisconsin and received the Ph.M. from the Philadelphia College of Pharmacy.

Lawrence W. Renner, secretary of Stark Co. (Ohio) Pharmaceutical Association, has completed a study of law and received a degree of LL.B. Mr. Renner is a graduate pharmacist.

Idaho State Pharmaceutical Association has issued a bulletin carrying the greater part of an interesting paper by Dean Eugene O. Leonard. The paper dealt with the early history of pharmacy, bringing it to modern times and pointing out some of the important services which the pharmacist renders, and how necessary it is to give the most careful attention to pharmaceutical practice. Professor Leonard pointed out the importance of cleanliness and careful business practice.

The Alabama Association Registration List includes three of its Veterans, namely, **L. C. Lewis,** Tuskegee; **J. W. Durr,** Montgomery; and **Samuel Williams,** Troy.

John A. Weeks and **Booker T. Latimer,** members of the Texas and Arkansas Board of Pharmacy, respectively, will retire after having served as board members for twenty-five years or more.

Mr. and Mrs. J. T. Coulson, Mr. and Mrs. C. J. DeWoody of Dallas, Texas, and **Mr. and Mrs. Charles Sutton** of Merck & Co., drove to the city of Mexico for a vacation.

E. von Hermann, of Chicago, celebrated his 81st birthday this month. He still gives attention to the work of his pharmacy on the 14th floor of a Chicago office building.

Herbert W. Parker, of Jonesboro, member of the Arkansas Board of Pharmacy, is being urged for Governor.

W. M. Hankins was guest-speaker at a dinner at the University of Florida. His subject was—"The Importance of the Little Things in Pharmacy." Mr. Hankins took the initiative for the establishment of the School of Pharmacy. He is a former president of the National Association of Boards of Pharmacy and of Florida Pharmaceutical Association. The dinner was sponsored by the Rho Chi Society.

J. W. Gayle, Kentucky, holds the record of tenure in office as secretary of a State pharmaceutical association. He has been secretary of Kentucky Pharmaceutical Association for 47 years.

Dean Charles H. LaWall was taken seriously ill while on an automobile trip and is now in a Harrisburg, Pa., hospital where he is slowly recovering. Professor LaWall was to have sailed for Copenhagen on July 3rd, to attend a meeting of the Committee upon Uniform Method of Opium Assay, as representative of the U. S. Treasury Department. Regret is expressed because of his illness and inability to serve on the important committee. He was also to be delegate at several pharmaceutical meetings, representing the AMERICAN PHARMACEUTICAL ASSOCIATION.

THE ITALIAN PHARMACY ACT.

The Italian Pharmacy Act has been revised. Among the requirements a pharmacy must carry all the medicaments of the Pharmacopœia. Inspection of the pharmacy in various details is proviedd. It is also provided that the pharmacy must have a Pharmacopœia for use by the public.

OBITUARY.

C. P. VAN SCHAACK.

Cornelius Peter Van Schaack, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1905, vice-president of Van Schaack Mutual, Inc., wholesale druggist, Chicago, died at his home in Wilmette, a suburb of Chicago, July 2nd.

Mr. Van Schaack was born May 26, 1863, in Manlius, N. Y. He engaged with George H. Schaefer & Co. in Madison, Ia., and several years later, about 1882, with a brother Robert H., he became associated with their father, Peter Van Schaack, in the wholesale drug business in Chicago, started by Brinkerhoff & Penton. The father had entered the business in 1870. In 1885 the firm name became Peter Van Schaack & Sons and under this name the business was incorporated in 1900; a merger was effected under the Roosa-Ellis plan and the name of "Mutual Drug Company of Chicago," Mr. Van Schaack became vice-president but retired in 1933, after fifty-four years of active connection with the wholesale drug business.

The deceased became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1905 and was deeply interested in its activities; Mrs. Van Schaack joined him in the membership. The latter survives with three sons, Cornelius Peter, Harding Byford and Eric Van Schaack.

MARION DORSET.

Dr. Marion Dorset—known for development of a hog cholera serum, the tuberculin test for milk cows and other work for the Department of Agriculture—died at his home in Washington, July 14th. He also developed a serum for the prevention of virulent diarrhea in poultry. He had been with the department since 1894, and at his death was chief of the bio-chemical division.

The deceased was born in Columbia Tenn., December 14, 1872. He studied at George Washington University and at the University of Pennsylvania, receiving his M.D. degree at the former institution. He was a member of the American Public Health Association, the American Chemical Society and the Society of American Bacteriolists. He was a fellow of the American Association for the Advancement of Science.

HAROLD W. SIMPKINS.

Harold Winslow Simpkins, treasurer and general sales manner of the Mallinckrodt Chemical Works, St. Louis, died July 11th, after a prolonged illness.

Mr. Simpkins was born in St. Louis, August 16, 1885. After attending Smith Academy, St. Louis, he prepared at St. Paul School, Concord, N. H., and entered Harvard University. He was graduated with the degree of bachelor of science in 1907. In 1917 he went with the Mallinckrodt Chemical Works, and in 1925 he became treasurer and sales manager. He succeeded H. W. Huning as general sales manager, January 1, 1931.

TENNESSEE PHARMACEUTICAL ASSOCIATION.

Tennessee Pharmaceutical Association is making preparations for its Golden Anniversary meeting July 15th to 18th in Memphis, under the direction of Edward Sheely. The *Southeastern Drug Journal* for July contains a complete list of the former presidents of the Association, beginning with 1886.

The Commencement Exercises of Western Reserve University School of Pharmacy were presided over by **Dean Edward Spease** and the principal address of the evening was made by **Dean C. B. Jordan.**

THE COPELAND BILL HEARING.

Congressional leaders were urged by President Roosevelt July 15th, to pass legislation at this session strengthening the pure food and drug laws.

This information was given to the House Interstate Commerce Committee by Chairman Rayburn, who will have charge of the Senate-approved Copeland bill.

Representative Chapman, of Kentucky, is Chairman of the Sub-Committee in charge of the hearings. The same announcement stated that the committee will have before it two other bills—the Mead and Sirovich measures.

Hearings started July 22nd.

SOCIETIES AND COLLEGES.

Programs of General Sessions, Council, House of Delegates and Sections.

For General Program of the ASSOCIATION see June JOURNAL, page 514. For programs of American Association Colleges of Pharmacy, National Association of Boards of Pharmacy, National Conference on Pharmaceutical Research and Plant Science Seminar, see pages 577–580 of this issue.

Officers of the Association.—*President*, Robert P. Fischelis; *Honorary President*, J. K. Lilly; *First Vice-President*, George D. Beal; *Second Vice-President*, Oscar Rennebohm; *Secretary*, E. F. Kelly; *Treasurer*, C. W. Holton; *Editor of the Year Book*, A. G. DuMez; *Editor of the Journal*, E. G. Eberle.

Officers-Elect.—*President*, Patrick H. Costello; *First Vice-President*, Frank A. Delgado; *Second Vice-President*, J. Lester Hayman; *Members of the Council:* James M. Beal, C. H. LaWall, R. L. Swain.

THE GENERAL SESSIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

SESSIONS, WEDNESDAY, AUGUST 7TH, 9:00 A.M.; THURSDAY, AUGUST 8TH, 2:00 P.M.; FRIDAY, AUGUST 9TH, 8:00 P.M.

First General Session, Wednesday, August 7th, 9:00 A.M.—Main Ball Room.

1. Call to Order.
2. Reading of Communications.
3. Annual Report of the House of Delegates, Rowland Jones, Jr., *Chairman*.
4. Address of the President, Robert P. Fischelis.
5. Unfinished Business.
6. New Business.
7. Report of the Committee on Maintenance, H. A. B. Dunning, *Chairman*.
8. Address, "The Practical Value to the Pharmacists of the Activities of the Council on Pharmacy and Chemistry of the American Medical Association," Joseph A. Pettit.
9. Address, "Dentistry and Pharmacy," Dr. P. T. Meany.

Second General Session, Thursday, August 8th, 2:00 P.M.—Main Ball Room.

1. Minutes of the First General Session.
2. Reading of Communications.
3. Report of the House of Delegates on the President's Address and Other Matters, Rowland Jones, Jr., *Chairman*.
4. Address, "The United States Pharmacopœia and the Federal Food and Drugs Act," James H. Beal.
5. Report of the Special Committee on The Council on Pharmaceutical Practice," E. F. Cook, *Chairman*.
6. Address, "Prescription Department Economics—Some High Lights of the Revised Edition of the Professional Pharmacy" (with lantern slides), Frank A. Delgado.
7. Symposium on Prescription Pricing.
8. Unfinished Business.
9. New Business.

Third General Session, Friday, August 9th 8:00 P.M.—Main Ball Room.

1. Minutes of the Second General Session.
2. Reading of Communications.
3. Final Report of the House of Delegates.
4. Unfinished Business.
5. Award of the Ebert Prize.
6. Installation of Officers.
7. Address of the President.
8. Final Adjournment.

COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

All sessions will be held in the Cameo Room.

Officers and Members of the Council.—*Chairman*, S. L. Hilton; *Vice-Chairman*, James H. Beal; *Secretary*, E. F. Kelly; Robert P. Fischelis, C. W. Holton, Oscar Rennebohm, George D. Beal, A. G. DuMez, E. G. Eberle, H. V. Arny, H. C. Christensen, Walter D. Adams, H. A. B. Dunning, W. Bruce Philip, Charles H. LaWall, C. E. Caspari.

SESSIONS.

A meeting will be called Saturday, August 3rd, 10:00 A.M.—if no quorum is present the meeting will be called Sunday, August 4th, at 10:00 A.M. Other meetings are scheduled for Thursday, 9:00 A.M. and Friday, 10:00 P.M.

HOUSE OF DELEGATES OF THE A. PH. A.

OFFICERS.

Chairman, Rowland Jones; *Vice-Chairman*, S. A. Williams; *Secretary*, E. F. Kelly.

First Session, Tuesday, August 6, 1935, 1:30 P.M.—Grand Ball Room.

1. Call to Order.
2. Roll Call of Delegates.
3. Reception of Fraternal Delegates.
4. Opening Remarks by the Chairman, Rowland Jones, Jr.
5. Appointment of Committee on Nominations.
6. Appointment of Committee on Resolutions.
7. Annual Report of the Council, E. F. Kelly, Secretary.
8. Report of the Treasurer, C. W. Holton.
9. Report of the Secretary, E. F. Kelly.
10. Reports of Delegates to Other Organizations (including International Pharmaceutical Federation, American Association for the Advancement of Science and National Drug Trade Conference).
11. Receipt of Resolutions, Reports and Other Communications—all of which must be in writing.
12. New Business.

Second Session, Wednesday, August 7, 1935, 8:00 P.M.—Grand Ball Room.

1. Roll Call of Delegates.
2. Reading and Adoption of the Minutes of the First Session.
3. Receipt of the Address of the President of the AMERICAN PHARMACEUTICAL ASSOCIATION.
4. Receipt of Reports and Other Communications from the Association, Council and Sections.
5. Receipt of Resolutions, Reports and Other Communications—all of which must be in writing.
6. Reports of the Committees on the Study of Pharmacy, R. P. Fischelis; on Cosmetics, H. C. Muldoon; on Local Branches, Adolph Ziefle; on Legislation, Ambrose Hunsberger; on U. S. Pharmacopœia, C. C. Glover; on Pharmaceutical Syllabus, J. C. Beard; on Pharmacy Week, Anton Hogstad, Jr.; on Horticultural Nomenclature, H. W. Youngken; on Physiological Testing, J. C. Munch; on Weights and Measures, P. H. Costello; on William Procter, Jr., Memorial Fund, J. E. Hancock; on International Pharmaceutical Nomenclature, A. G. DuMez.
7. Election of the Honorary President, Secretary and Treasurer of the Association upon Nomination by the Council.
8. Report of the Committee on Nominations.
9. Report of the Committee on Place of Meeting.
10. Report of the Committee on Resolutions.
11. Unfinished Business.

Third Session, Friday, August 9, 1935—2:00 P.M.—Grand Ball Room.

1. Roll Call of Delegates.
2. Reading and Adoption of the Minutes of the Second Session.
3. Receipt of Reports and Other Communications from the Association, Council and Sections.
4. Reports of the Committees on Press Relations, E. F. Kelly; on Pre-requisite Legislation, C. B. Jordan; on Endowment Fund, J. H. Beal; on Pharmacy Corps in the U. S. Army, H. E. Kendig; on Transportation, T. J. Bradley; on Prescription Tolerances, H. H. Schaefer; to Draft Model Act Restricting Distribution of Drugs and Medicines to Pharmacists, W. B. Philip, on National Code Matters, E. F. Kelly; on Professional Relations, L. A. Seltzer; on Development of Pharmacy Laws, R. L. Swain; on State Codes, C. L. O'Connell; on Council on Pharmaceutical Practice, E. F. Cook.
5. Final Report of Committee on Resolutions.
6. Unfinished Business.
7. Installation of the Chairman and Vice-Chairman of the House of Delegates.
8. Final Adjournment.

SCIENTIFIC SECTION.

OFFICERS.

Chairman, E. V. Lynn; *First Vice-Chairman*, H. M. Burlage; *Second Vice-Chairman*, R. E. Schoetzow; *Secretary*, F. E. Bibbins; *Delegate to the House of Delegates*, L. W. Rowe.

First Session, Wednesday, August 7th, 2:00 P.M.—Assembly Hall.

Program.

1. Chairman's Address, E. V. Lynn.
2. Secretary's Report, F. E. Bibbins.

3. Committee Reports, Board of Review of Papers, F. E. Bibbins, *Chairman*.
   Committee to Coöperate with the National Conference on Pharmaceutical Research, John C. Krantz, Jr., *Chairman*.
   Committee on Monographs, E. E. Swanson, *Chairman*.
4. Appointment of Nominating Committee.
5. General Business.
6. Papers.

"A Note on the Action of Alkalies and Alkali Salts on Antipyrine," Loyd E. Harris and Ercell D. Tebow.

"The Tests for Redistilled Water in the National Formulary VI Monograph," R. S. Adamson, R. K. Snyder and E. N. Gathercoal.

"A Note on the Assay of Mass of Ferrous Carbonate," John C. Krantz, Jr., and C. Jelleff Carr.

"A Simplified Assay for the Official Iodine-Iodide Solutions," William F. Reindollar.

"The Bacteriocidal and Bacteriostatic Value of Colloidal Cadmium Proteinate," W. A. Lott and W. G. Christiansen.

"Antiseptic Solutions," Esther Meyer and E. N. Gathercoal.

"Antiseptics—a Comparative Study of Laboratory and Practical Tests," George F. Reddish.

"Comparison of Nessler's Reagent Test with Other Tests for Aldehydes in Ether," E. C. Billheimer, F. VanDeripe, F. F. Berg and F. W. Nitardy.

"A Modified Nessler's Reagent Test for Aldehydes in Ether," E. C. Billheimer, F. VanDeripe, F. F. Berg and F. W. Nitardy.

"The Official Sulphur Ointments and Their Assay," Henry M. Burlage and Charles E. Brady.

"Bismuth-Sodium-Potassium Tartrate Solutions," A. H. Clark.

"A Further Note on the Stability of Sodium Sulphite," A. H. Clark and Solomon Gershon.

"A Rapid Method for Standardizing Silver Nitrate Volumetric Solution," Robert D'Orazio.

"Studies on the Determination of Camphor in Camphor Liniment. IV. The Use of Antioxidants," Chas. F. Poe.

"The Addition of Strong Hydrogen Peroxide in the Determinations of Nitrogen in Organic Compounds," Chas. F. Poe and Bartlett T. Dewey.

"Daturic Acid, a Literature Review," Ralph W. Clark.

"A Study of the U. S. P. Thyroid Assay," George D. Beal and Chester R. Szalkowski.

"The Assay of Official Preparations for Phenol," Glenn L. Jenkins and Melvin H. Dunker. (Presented by title.)

"Observations on Opium Assay," Joseph Rosin and C. J. Williams.

"Opium Assay, Assay Hydrolysis Method for," G. E. Mallory and Peter Valaer, Jr. (Presented by title.)

"The Assay of Official Syrups Containing Hypophosphites," Glenn L. Jenkins and Charles F. Bruening. (Presented by title.)

"The Assay of Official Hypophosphite Salts," Glenn L. Jenkins and Charles F. Bruening. (Presented by title.)

"Organic Medicinal Preparations Containing Arsenic, the Assay of," Edward J. Hughes. (Presented by title.)

"Some Mercuriated Derivatives of Thymol and Carvacrol," Joseph B. Burt. (Presented by title.)

"Mercury Derivatives of Azo Dyes," Wm. Braker and W. G. Christiansen.

"Phenyl Mercury Nitrate and Some Other Phenyl Mercury Salts," T. B. Grave, S. E. Harris and W. G. Christiansen.

Second Session, Thursday, August 8th, 9:00 A.M.—Assembly Hall.

7. Papers.

"Studies on the Pharmacology of Trichlorethylene," John C. Krantz, Jr., C. Jelleff Carr and Ruth Musser.

"Absorption of Drugs by the Human Skin," A. Richard Bliss, Jr.

"The Effectiveness of Theelol by Oral Administration," L. W. Rowe and A. E. Simond.

"Notes on the Colorimetric Assay of Digitalis by the Knudsen and Dresbach Method," F. A. Upsher Smith.

"Comparison of Six Methods in Assaying the New Ergot Principle," Edward E. Swanson, Chester C. Hargreaves and K. K. Chen.

"F. E. Ergot—Apparent Increase in Activity Due to Acid," F. F. Berg.

"A Toxicological Study of the Cutaneous Secretions of the Salamander, *Triturus torosus* (Rathke)," Ernst T. Stuhr.

"Dialkyl Amino Acetylureas," F. C. Daniels.

"A Study of the Assay of Aconite and the Stability of Its Preparations," Geo. L. Baker and C. B. Jordan.

"The Fatty Oil of Podophyllum Peltatum," Arthur H. Uhl.

"Evaluation of a Deterioration Factor in Liquid Petrolatum," P. L. Burrin, A. G. Worton and F. E. Bibbins.

"A New Silver and Mercury Colloidal Compound," Earl Voelker.

"Modern Pharmaceutical Research Problems," Henry J. Goeckel.

"Some Thymol Derivatives of Possible Medicinal Value," F. A. Gilfillan and John R. Merritt.

"Solution Cresol Compound—The Variation of Phenol Coefficient when Different Oils Are Used for Saponaceous Base," P. L. Burrin, A. G. Worton and F. E. Bibbins.

"Ephedrine Synthesis I: The Preparation of Propiophenone Diethyl Acetal and of 1-Phenyl-1-Ethoxy-Propene-1," Ernest L. Beals and F. A. Gilfillan.

"Strychnine. IV. Lethal Dose Studies on Cattle and Sheep," J. C. Ward and F. E. Garlough.

"Strychnine. V. Variations in Response of the Same and Different Species of Rodents," A. W. Moore.

"Strychnine. VI. Variations in Physiological Action of C. P. Strychnine," J. C. Ward, J. C. Munch and F. E. Garlough.

"The Detoxification of Strychnine Sulphate by Pentobarbital Sodium," Edward E. Swanson.

"The Preparation of *p*-Butyl Saligenin," Robb V. Rice, W. C. Hardin and Glenn L. Jenkins. (Presented by title.)

"Studies on Barbiturates. XI. Further Contributions to Methods of Barbital Research," Charles R. Linegar, James M. Dille and Theodore Koppanyi. (Presented by title.)

"A New Crystalline Compound from Catnip," Minnie Meyer and Edward Kremers. (Presented by title.)

"A Chemical Examination of the Fatty Oil of Poke Root," Glenn L. Jenkins and Samuel W. Goldstein. (Presented by title.)

"Rational Application of the Earthworm as a Test-Object in the Evaluation of Vermicides," Glenn L. Jenkins and L. L. Manchey. (Presented by title.)

"The Importance of Kidneys in the Standardization of Digitalis," B. Boucek. (Presented by title.)

"A Comparative Study of the Pharmacological Actions of Natural and Synthetic Camphor," B. V. Christensen and H. J. Lynch. (Presented by title.)

"Cyanide Poisoning and Its Treatment," K. K. Chen, Charles L. Rose and G. H. A. Clowes. (Presented by title.)

"Pharmacological Action of the Alkaloid of Han-fang-chi," K. K. Chen, A. Ling Chen, Robert C. Anderson and Charles L. Rose. (Presented by title.)

"Action of Chinese Corydalis Alkaloids," K. K. Chen, Robert C. Anderson and T. Q. Chou. (Presented by title.)

Joint Session: Scientific Section and the Section on Practical Pharmacy and Dispensing, August 8th, 8:00 P.M.—Assembly Hall.

8. Report on the U. S. Pharmacopœia, E. Fullerton Cook.
9. Report on the National Formulary, E. N. Gathercoal.
10. Report on the Recipe Book, J. Leon Lascoff.
11. Report of Committee on Unofficial Standards, John C. Krantz, Jr.
12. Report of Committee on Glass Standardization, H. V. Arny.
13. Report of Committee on Ebert Prize, G. L. Jenkins.
14. Report of Committee on Collection of Information Pertaining to Professional Pharmacy, Marvin J. Andrews.
15. Report of Committee on Prescription Tolerance.
16. Papers.

"Daphnia—The Living Reagent" (with motion picture), Arno Viehoever.

"Biochemistry of Podophyllum Peltatum," Arno Viehoever and Harry Mack.

Third Session, Friday, August 9th, 9:00 A.M.—Assembly Hall.

17. Papers.

"The Alkaloidal Content of Oregon-Grown Cytisus Scoparius," F. A. Gilfillan and Felipe Patricio Logan.

"Studies on Cudbear," E. H. Wirth, L. E. Martin and P. G. Soderdahl.

"Morphological Studies on Polygala Senega," Paul D. Carpenter.

"Studies on Poplar Bud," Gerston Bruch and Elmer H. Wirth.

"A Study of Lacinaria Species," B. V. Christensen and G. M. Hocking.

"Differentiating Characteristics of Glycyrrhiza Plants," Arno Viehoever.

"A Microscopy of Powdered Desiccated Thyroid and Suprarenal Glands," Heber W. Youngken.

"Drug Extraction. V. The Extraction of Belladonna Root with Glycerinic Menstrua," W. J. Husa and Louis Magid.

"A Method of Preparation of Buffers for Prescriptions," N. Allen.

"Drug Extraction. VI. Determination of the Pressure Exerted by a Drug during Percolation," W. J. Husa and Louis Magid.

"Drug Extraction. VII. The Effect of Method of Packing on Efficiency of Percolation," W. J. Husa and C. L. Huyck.

"Drug Extraction. VIII. The Effect of Maceration and Rate of Flow on the Efficiency of Percolation," William J. Husa and C. L. Huyck.

"Drug Extraction. IX. The Efficiency of Repercolation for Belladonna Root and Nux Vomica," William J. Husa and C. L. Huyck.

"The Influence of Certain Salts on Morphine Toxicity and Narcosis in Mice and Rats," J. M. Ort and W. G. Christiansen.

"A New Type of Hypnotic Amide, *N*-(*beta keto propyl*) Diethyl Acetamide," W. A. Lott and W. G. Christiansen.

"Preparation of Benzoyl Persulphide," E. Moness, W. A. Lott, F. F. Berg and W. G. Christiansen.

"The Percolation of Cinchona," J. L. Powers and Edward Kremers.

"Bioassays of Rodenticides," J. C. Munch, F. E. Garlough and J. C. Ward

"Thallium. XIII. Symptoms and Systemic Action on Cattle," J. C. Ward.

"Constituents of Ma-fang-chi," A. Ling Chen and K. K. Chen. (Presented by title.)

"The Cat Units of 7 Crystalline Cardiac Principles from Plants," K. K. Chen, A. Ling Chen and Robert C. Anderson. (Presented by title.)

"Harmine from Caapi," A. Ling Chen and K. K. Chen. (Presented by title.)

"A Study of Several Species of the Genus Monarda," B. V. Christensen, and R. S. Justice. (Presented by title.)

"A Histology of Cracca Virginiana Linne Root," B. V. Christensen and Elbert Voss. (Presented by title.)

"Monarda pectinata, Nutt., A. Phytochemical Study," Joseph B. Burt and Edward Kremers. (Presented by title.)

"Thiobarbiturates. III. Comparison of Sulphur and Oxygen Analogues," Ellis Miller, James C. Munch and Frank S. Crossley. (Presented by title).

"Enzymatic Action in the Presence of Some Common Antiseptics," O. E. Rumple and R. J. Hartman.

18. Reports of Committees.
19. Nomination of Officers.
20. New Business.
21. Unfinished Business.
22. Election and Installation of Officers.
23. Adjournment.

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

(PHARMACOPŒIAS, FORMULARIES AND STANDARDS.)

OFFICERS.

Chairman, H. M. Burlage; *First Vice Chairman*, L. W. Rising; *Second Vice-Chairman*, Frank L. Black; *Secretary*, Leon W. Richards; *Delegate to the House of Delegates*, R. W. Clark.

First Session, Thursday, 9:00 A.M.—Grand Ball Room.

Program.

1. Chairman's Address, H. M. Burlage.
2. Secretary's Report, Leon W. Richards.
3. Report of the Committee on Prescription Tolerances for 1934–1935, H. H. Schaefer.
4. Appointment of Committees.
5. Papers.

"New Standards for Medicinal Carbon in U. S. P. XI," Joseph Rosin, Geo. D. Beal and Chester R. Szalkowski.

"Foresight in Professional Pharmacy," Ernest T. Stuhr.

"Dentistry and Pharmacy as Cognate Professions," Raymond P. LeRoy.

"Is Extemporaneous Pharmacy a Moribund Art?" Wm. F. Reindollar.

"Back to Pharmacy," Roy A. Perry.

"Manufacturing and Marketing Toilet Products from Your Own Laboratory," Alex F. Peterson, Jr.

"New Products and the Problems They Present," Ronald V. Robertson.

"The Stabilization of Milk of Magnesia by Citric Acid," E. C. Billheimer, F. F. Berg and F. W. Nitardy.

"Comparison of Spectrometric and Antimony Trichloride Methods for the Estimation of the Vitamin A Potency of Fish Liver Oils," W. S. Jones, F. F. Berg and W. G. Christiansen.

"Study on Washing of Milk of Magnesia through a Permeable Membrane," E. Moness, W. A. Lott, F. F. Berg and W. G. Christiansen.

"A Service That Built a Prescription Business," L. D. Bracken.

"The Need of Greater Care in the Dispensing of Potent Medicinal Substances in the Form of Sugar-Coated Pills in Confections," John F. Suchy.

"Problems of Retailing," Roy A. Perry.

"The Hospital Pharmacist Work in Southern California," P. W. Howard.

"The Hospital and the Pharmacist. Some Observations in Establishing a Department of Pharmacy," H. C. McAllister.

"A Plan for Pharmacy Internships at the University of Michigan Hospitals," Harvey A. K. Whitney[1] and E. C. Watts.[2]

"Practical Pharmacy Problems," Carl Gibson.

"The Physician and the Pharmacist," Ralph W. Clark.

"Ointments," Ralph W. Clark.

Second Session, Friday, 2:00 P.M.—Grand Ball Room.

"The Preparation of the Resin of Podophyllum," Arthur H. Uhl.

"Hydrophile Petrolatum," Bernard Fantus and Hattie Dyniewicz.

"Improvement in Technique in the Preparation of Three Common Products," Edward D. Davy.

"Tincture of Opium—Process to Reduce Precipitation," P. L. Burrin and F. E. Bibbins.

"Studies on Three U. S. P. and N. F. Preparations by Shortened Procedures," Henry M. Burlage with W. J. Smith.

"Suggested Changes in Three Official Preparations," C. L. Cox.

"Modernized Progress of Pharmacy in the Realms of Dispensing," C. George Hamilton.

"Errors in Methods Used for Testing Enteric Coatings," F. S. Bukey and C. W. Bliven.

"The Percentage Preparation," Ralph Bienfang.

"A Table of Equivalents," Ralph Bienfang.

"Percentage Solutions," Earl Gunther.

"It Can Be Done. Difficult Preparations, Series No. IV," J. Leon Lascoff.

"Pharmaceutical and Chemical Incompatibilities," Geo. L. Secord.

"Prescription Problems," Thomas G. Wright.

"Dropper for Tincture Digitalis," R. A. Konnerth, R. E. Schoetzow and F. F. Berg.

"Assay of Liniment of Camphor," D. A. Overby, R. E. Schoetzow and F. F. Berg.

Joint Session with the Scientific Session, Thursday, August 8th, 8:00 P.M.—Assembly Hall.

(See order under Scientific Section.)

6. Report on U. S. Pharmacopœia, E. Fullerton Cook (20 minutes).
7. Report on National Formulary, E. N. Gathercoal (15 minutes).
8. Report of Recipe Book, J. Leon Lascoff (10 minutes).
9. Report of Committee on Glass Standardization, H. V. Arny (10 minutes).
10. Report of Committee on Ebert Prize, G. L. Jenkins.
11. Report of Committee on Unofficial Standards, John C. Krantz, Jr.
12. Report of Committee on Collection of Information Pertaining to Professional Pharmacy, Marvin J. Andrews.
13. Report of Committee on Prescription Tolerances.
14. Papers.

"Daphnia—the Living Reagent" (with Motion Picture), Arno Viehoever.

"Biochemistry of Podophyllum Peltatum," Arno Viehoever and Harry Mack.

"Differentiating Characteristics of Glycyrrhiza Plants," Arno Viehoever.

SECTION ON EDUCATION AND LEGISLATION.

Officers.

Chairman, Oscar E. Russell; *Vice-Chairman*, Charles W. Ballard; *Secretary*, L. W. Rising;

[1] Chief Pharmacist.

[2] Assistant Chief Pharmacist.

Delegate to the House of Delegates, George C. Schicks.

First Session, Wednesday, August 7th, 2:00 P.M.—Colonial Room.

1. Chairman's Address, Oscar E. Russell.
2. Secretary's Report, L. Wait Rising.
3. Report of the National Dental Committee, G. C. Schicks.
4. Report of the Committee on Coöperation with Hospital Pharmacists, R. W. Rodman.
5. General Business (Committee appointments, etc.).
6. Papers.

"Things to Be Considered in the Promotion of Official Products," Marvin J. Andrews.

"What Price Prescriptions?" F. C. Felter.

"Your Opportunity for Publicity," Howard Stephenson.

"Development of Pharmaceutical Education and Legislation in Georgia." A discussion, Robert C. Wilson.

"Entangling Alliances," Wortley F. Rudd.

"The Changing Attitude of Government toward Professional Pharmacy," Arthur D. Baker.

"Students, Deans, Druggists and Legislators," E. J. Parr.

"Undergraduate Research," Lawrence H. Baldinger.

"Substitution, an Unnecessary Evil," J. Norman Silsby.

"A Limited Enrollment Selective Plan," A. Richard Bliss, Jr.

Second Session, Friday, August 9th, 9:00 A.M. —Assembly Hall.

"Problems in Pharmaceutical Education," H. B. Carey.

"Presentation of Basic Sciences in Colleges of Pharmacy," T. C. Daniels.

"Questions Testing the Recognitive Faculties of Students," J. H. Goodness.

"The Fate of the Pharmacist under State or Socialized Medicine," J. H. Kidder.

"Fair Trade Legislation," Frank A. Mortenson.

"Why Pharmacy Legislation Fails," Hugh P. Beirne.

"The Pharmacist and the Pediatrist," W. F. Ambroz.

"National Unity of State Coöperation between Pharmacists and Physicians," G. C. Schicks.

"Pharmacy Legislation in Mississippi," Lew Wallace.

"Discussion of Education and Legislation," W. Mac Childs.

"A Practical Method of Increasing the Prestige of Pharmacy as a Profession," L. Wait Rising.

7. Unfinished Business.
8. Report of Committee.
9. Election and Installation of Officers.
10. Adjournment.

SECTION ON COMMERCIAL INTERESTS.

Officers.

Chairman, Henry Brown; *Vice-Chairman*, Robert W. Rodman; *Secretary*, R. T. Lakey; *Delegate to the House of Delegates*, John A. J. Funk.

First Session, Wednesday, August 7th, 2:00 P.M.—Marine Room.

1. Chairman's Address, Henry Brown.
2. Report of Secretary, R. T. Lakey.
3. Appointment of Committees.
4. Papers.

"The Pharmacist Studies Law," Charles G. Ajax.

"How to Help the Pharmacist Commercially," Eugene C. Brokmeyer.

"A Study of the Commercial Pharmacy Curriculum," Neal Bowman.

"What Determines Net Profit?" C. Leonard O'Connell.

"The Fair Trade Acts and Their Effects," Paul C. Olsen.

"The Selling Price of Prescriptions," Frank A. Delgado.

"The Open-View Prescription Department," Frank A. Delgado.

"Merchandising Your Profession," Ralph A. Beegle.

"The Need of Commercial Training in Colleges of Pharmacy," Ralph A. Beegle.

"Dogs, Cats, Birds and Babies," Alice-Esther Garvin.

Second Session, Thursday, August 8th, 2:00 P.M.—Marine Room.

"The Futility of Cutting Prices and a Comparative Price Survey of Two States—One with a Price Maintenance Act," George M. Archambault.

"The California Fair Trade Act," Ira Darling (University of California).

"A Scientific Study of the Merchandising Value of Windows," F. A. Geue.

"A Comparison of the Ratios of Wisconsin

Drug Stores at the Time the State Pharmacy Law Was Passed and at Present," Minnie Myers and Edward Kremers.

"Vaccines and Serum Products of the U. S. P. XI," Clarence M. Brown.

"Questions Testing the Recognitive Faculties of Students," Joseph H. Goodness.

5. Unfinished Business.
6. Report of Committees.
7. Election and Installation of Officers.
8. Adjournment.

SECTION ON HISTORICAL PHARMACY.

OFFICERS.

Chairman, C. O. Lee; *Secretary*, H. W. Youngken; *Historian*, Eugene G. Eberle.

SESSIONS: WEDNESDAY, AUGUST 7, 2:00 P.M. AND THURSDAY, AUGUST 8, 9:00 A.M.

Program.

Wednesday, 2:00 P.M., First Session—Rose Room.

1. Address by the Chairman.
2. Report of the Historian.
3. Report of the Secretary.
4. Papers—Subject to rearrangement.

"A Brief History of the Drug Code," E. F. Kelly.

"Pharmacy and a Commemorative Stamp." Illustrated by Lantern Slides, F. A. Delgado.

"The First Pharmacist in North America," Theodore J. Bradley.

"William Withering and the Introduction of Digitalis into Medical Practice," Louis A. Roddis.

"Moses Maimonides, Physician and Author of Medical Works," Louis Gershenfeld.

"David Henshaw—from Druggist to Secretary of the Navy," George E. Ewe.

"John Marsh, a Medico-Pharmaceutical Practitioner on Six Frontiers," Edward Kremers.

"Early Drug Stores in Oklahoma," Loyd E. Harris.

"The Pharmacopœia of 1880," L. M. Parks.

"The Massachusetts Pharmacopœia of 1808," Edward H. Niles.

"The Californian Indians, Their Medical Practices and Their Drugs," John Culley.

"Estonian Pharmacy," Rudolph Wallner.[1]

5. Appointment of Nominating Committee.

[1] Retail Estonian pharmacist.

Thursday, August 8th, 9:00 A.M., Second Session—Rose Room.

State Association Secretaries, arranged in order of service, J. G. Beard.

"Medical Practices of the New England Indians," Will T. Bradley.

"Pioneers of Pharmaceutical Education in the United States," Ernst T. Stuhr.

"A History of Dentifrices," Martha E. Faulk.

"Apothecary Shops of Colonial Times," Millicent R. LaWall.

"Medicine Making as Depicted by Museum Dioramas," Charles Whitebread.

"Honoring Age and Service," John E. Kramer.

"Report of the Pharmacy Exhibit for 1933 and 1934," H. C. Christensen.

"Drugs of the Bible," A. R. Bliss, Jr.

"The Ancient Medicinal Uses of Gums and Precious Stones," A. R. Bliss, Jr.

"History of the Dorflinger Druggists Show Globes," R. W. Rodman.

"The Pharmaceutical Museum at the University of Minnesota," F. J. Wulling.

"Mandragora," W. H. Blome.

Other papers to be announced.

6. Report of Nominating Committee.
7. Election and Installation of Officers.
8. Adjournment.

CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES.

OFFICERS.

President, F. V. McCullough; *First Vice-President*, J. W. Slocum; *Second Vice-President*, Roy C. Reese; *Secretary-Treasurer*, Carl G. A. Harring; *Delegate to the House of Delegates*, C. J. Clayton; *Members of the Executive Committee*, J. Lester Hayman, J. J. Gill, Roy Reese,[1] W. E. Bingham.[1]

The President will announce further items and changes.

SESSIONS.

First Session, Wednesday, August 7th, 2:00 P.M.; Joint Session, Section on Education and Legislation, Conference of Pharmaceutical Law Enforcement Officials, Thursday, August 8th, 8:00 P.M.; Second Session, Conference of Pharmaceutical Association Secretaries, 9:00 A.M.

[1] Deceased.

First Session, Wednesday, August 7th, 2:00 P.M.—Club Room.

1. Call to Order.
2. Remarks of Chairman, F. V. McCullough.
3. Report of Secretary, Carl G. A. Harring.
4. Calling of Roll by Secretary.
5. Report of Committee on Constitution and By-Laws.
6. Address, "The N. A. R. D. Washington Bulletin to Association Secretaries," Rowland Jones.

The Conference of Pharmaceutical Association Secretaries will try the plan of having no papers read but, instead, devote the sessions to round table discussions of timely topics. A list of topics follows, which may be added to:

TOPICS.

"The Progress in Affiliation of Associations Representing Organized Pharmacy," and a review of the findings of the joint committee representing the N. A. R. D., A. PH. A. and State Secretaries at the Washington Conference.

Joint Session with Section on Education and Legislation and Conference of Pharmaceutical Law Enforcement Officials, Thursday, August 8th, 8:00 P.M.—Junior Ball Room.

Topics for Discussion to be provided.
Reports on enacted and proposed legislation in various states.

Second Session, Friday, August 9th, 9:00 A.M. —Club Room.

"The Secretary's Obligation to the Industry in Promoting Sound Business and Fair Trade Practices," Discussion led by J. W. Slocum.

"The Secretary's Obligation to the Profession in Promoting the Professional Phase of the Practice of Pharmacy," Discussion led by R. C. Wilson.

"The Secretary's Obligation to the Industry and Profession in Sponsoring State and National Legislation," Discussion led by Roy S. Warnack.

7. New Business.
8. Election of Officers.

CONFERENCE OF PHARMACEUTICAL ASSOCIATION LAW ENFORCEMENT OFFICIALS.

The chairman will announce additions and changes.

OFFICERS.

Chairman, R. L. Swain; *Secretary*, M. N. Ford; *Delegate to the House of Delegates*, Fred Schaefer.

SESSIONS.

First Session, Thursday, August 8th, 9:00 A.M.; Thursday, August 8th, 8:00 P.M., Joint Session, Section on Education and Legislation and Conference of Pharmaceutical Association Secretaries; Second Session, Friday, August 9th, 9:00 A.M.

Program.

(Changes may be made if deemed necessary and expedient.)

First Session, Thursday, August 8th, 9:00 A.M. —Club Room.

1. Call to Order.
2. Remarks by Chairman, Robert L. Swain.
3. Report of Secretary, M. N. Ford.
4. Report of Finance Committee.
5. Pharmacy Law Enforcement in Washington, Oregon and Idaho: Harry C. Huse, Director of Licenses, Washington; Linne E. Jones, Secretary, Oregon Board of Pharmacy; Frank L. Christenson, President, Idaho Board of Pharmacy.
6. Report of New Legislation Affecting the Control of Pharmacies, Pharmacists and the Manufacture and Distribution of Drugs and Medicines.

   Robert P. Fischelis, New Jersey.
   George W. Mather, New York.
   Robert L. Swain, Maryland.
   W. Mac Childs, Kansas.
   P. H. Costello, South Dakota.
   Edna E. Gleason, California.
   R. C. Shultz, Wyoming.
   J. A. Riedel, Montana.
   R. W. Fleming, Nevada.
   A. L. I. Winne, Virginia.
   Roy B. Cook, West Virginia.

7. Round Table Discussion:

   Is It Advisable to Give Boards of Pharmacy Authority to Limit the Number of Students Entering Courses in Pharmacy?

   Should Boards of Pharmacy be Empowered to Regulate the Number of Drug Stores, and, if So, What Shall Be the Basis of Such Regulation?

   What Can Be Done to Further Restrict to Pharmacists the Distribution of Potent Drugs and Medicines and Medicines in General?

   Have the "Barbituric Acid Laws" Worked Out Satisfactorily?

Should Law Enforcement Officials Attempt Some Program Looking to Supervised Experience?

What Enforcement Difficulties Have Been Met with under the Uniform State Narcotic Act?

The Requirements for Drug Store Permits:

1. U. S. P. and N. F.
2. Apparatus and Equipment.
3. Sanitation.
4. Personnel.
5. Etc.

Joint Session with Section on Education and Legislation and Conference of Pharmaceutical Association Secretaries, Thursday, August 8th, 8:00 P.M.—Junior Ball Room.

8. Election and Installation of Officers.
9. Unfinished Business.
10. Adjournment.

STATE PHARMACEUTICAL ASSOCIATION OFFICERS.

ALABAMA.

N. G. Hubbard, former president of the Birmingham Association of Retail Druggists, was advanced to the presidency of the Alabama Pharmaceutical Association. Other officers for the ensuing year are: *First Vice-President*, Sam Watkins, Dora; *Second Vice-President*, E. M. Megginson, Mobile; *Treasurer*, W. H. Ward, Tuscaloosa; *Secretary*, Z. C. Lewis, Montgomery.

ARKANSAS.

Lew Wallace, of the Mississippi Pharmaceutical Association, addressed the Arkansas Association on the subject "Mississippi's program on U. S. P. and N. F. Propaganda." The resolutions committee's report was received with enthusiasm; also that on the outstanding endorsement of Herbert Parker for governor of Arkansas. Officers elected and installed include: *President*, J. E. Berry, Smackover; *Vice-Presidents*, Charles Dana Gibson, Hope, and Guy Elkins, Booneville; *Treasurer*, Troy Churchman, North Little Rock; *Secretary-Manager*, Irl Brite, Little Rock; *Sergeant-at-Arms*, W. R. Griffin, Heber Springs; *Place of Meeting*, Little Rock; *Time*, 1936.

CALIFORNIA.

The following officers were elected for the ensuing year by California Pharmaceutical Association: *President*, Wm. Rutherford, Santa Rosa; *First Vice-President*, Charles R. Seward, Pasadena; *Second Vice-President*, Louis Fischl, Berkeley; *Third Vice-President*, T. D. Perkins, San Diego; *Treasurer*, John G. Wagner, Long Beach; *Executive Secretary*, Roy S. Warnack, Los Angeles.

Assembly Bill 1870—the fair trade practice act, and Assembly Bill 2365—the chain store tax bill are most important bills so far as individual merchants and fairness in merchandising are concerned. Senate Bill 229 amends the State Narcotic Act. The most important change is as follows: "Within 24 hours after any purchaser in this state gives an order to, or makes any contract or agreement for purchases from or sales by, an out-of-state wholesaler or manufacturer of any narcotic drugs specified in Section 1 of this act for delivery in this State, such purchaser shall forward to the State Division of Narcotic Enforcement by registered mail, a true and correct copy of the order, contract or agreement."

COLORADO.

The officers elected for the ensuing year are: *President*, Paul G. Stodghill, Denver; *First Vice-President*, Clyde C. Phillips, Jr., Colorado Springs; *Second Vice-President*, H. Rodney Anderson, Montrose; *Treasurer*, V. N. Lagerquist, La Junta; *Secretary*, Chas. J. Clayton, Denver.

INDIANA.

A session of Indiana Pharmaceutical Association was given over to the "Keeping Up of the Profession." Another to the theme, "Keeping Profits Up." The subjects were: "Club Selling," "Profitable Store Arrangement and Displays," "Profitable Advertising and Small Town Druggists."

Officers elected for the year are: *President*, H. W. Miller; *Vice-Presidents*, G. D. Revington, R. E. Thornburg and Charles E. Reed; Herbert H. Gerding and Retiring President E. N. Harper are new *Executive Committeemen*. *Secretary* F. V. McCullough and *Treasurer* Harry J. Borst were re-elected.

MARYLAND.

District of Columbia pharmacists joined members of the Maryland Pharmaceutical Association in the annual convention. Much attention was given to the Fair Trade Act, R. L. Swain gave an analysis of this important legislation and others added to his remarks. Among speakers on this and other subjects were W. Bruce Philip, E. F. Kelly, A. G. DuMez and others.

Marvin J. Andrews reported on tolerances in prescription practice; A. H. Bryan presented a paper on antiseptic action of ointments and face creams; J. Leon Lascoff explained "how it could be done" in the presentation of another paper to the helpful series begun several years ago.

The program was made up of interesting studies and well and favorably known speakers; among others, besides those mentioned were: Dean W. Paul Briggs, Rowland Jones, Marvin R. Thompson.

The Governor of Maryland and the Mayor of Baltimore were named on the program as banquet speakers. Hugh Craig, of the *Oil Paint and Drug Reporter*, chose as his subject "The Need for Economic Harmonies."

The associations heard the discussions of subjects of timely importance by two presidents who had given time and study to conditions affecting pharmacy and the drug business. President Andrew F. Ludwig delivered his address the second day of the convention and President A. C. Taylor on the following day.

The officers chosen for the ensuing year are: *President*, H. W. Matheney, Cumberland; *Vice-Presidents*, Melville Strassburger, Baltimore, and H. A. M. Dewing, Centreville; *Secretary*, E. F. Kelly; *Treasurer*, Harry S. Harrison; *Members of Executive Committee*, C. C. Neal, W. B. Spire, L. V. Johnson, Andrew F. Ludwig, Aquilla Jackson, John Wannenwetsch; *Editor, Maryland Pharmacist*, R. L. Swain. Alfred E. Pearre, Frederick, *Honorary President*.

MICHIGAN.

The new officers of the Michigan Association are: *President*, Benjamin Peck of Kalamazoo; *First Vice-President*, Joseph Maltas of Sault Ste. Marie; *Second Vice-President*, James Lyons, Detroit; *Secretary*, Clare Allan, Wyandotte; *Treasurer*, Henry Hadley of Benton Harbor. Ray Jensen of Grand Rapids and Peter McFarlane of Lansing are members of the *Executive Committee*.

MISSISSIPPI.

Mississippi adopted a resolution urging abolition of the state sales tax. The following officers were elected: *President*, J. S. Puller, Starkville; *First Vice-President*, W. J. Cox, Nettleton; *Secretary-Treasurer*, S. B. Key, Jackson; *Executive Committeemen* are: H. B. McInnis, Lumberton; G. C. Roberts, Greenwood, and Lew Wallace, Laurel.

NEW HAMPSHIRE.

The following officers were elected: *President*, George A. Moulton, Peterborough; *Vice-Presidents*, Lawrence E. Cate, Rochester, and Frank J. Kelly, Concord; *Secretary*, Rodney A. Griffin, Franklin; *Treasurer*, A. E. Gosselin, Manchester; *Auditor*, Herbert E. Rice, Nashua.

NORTH DAKOTA.

The following were elected at the Golden Anniversary meeting of North Dakota Pharmaceutical Association: *President*, H. Saunders, Minot. Mr. Saunders succeeds Lloyd G. Beardsley of New Rockford, who becomes a member of the executive committee. Other officers are: *First Vice-President*, Andrew E. Erickson, Fargo; *Second Vice-President*, Philip Boise, Dickinson; W. F. Sudro, Fargo, was reëlected *Secretary*, and P. H. Costello, Cooperstown, reëlected *Treasurer*.

The history of the association from its incorporation December 15, 1886, under Dakota territory laws to the present time was traced by W. P. Porterfield of Fargo at the dinner meeting of the Veteran's association.

VERMONT.

Officers of Vermont Pharmaceutical Association elected for the ensuing year are: *President*, George T. Donovan, Fair Haven; *Vice-Presidents*, Joseph W. Blakely, Montpelier; F. W. Wheeler, Springfield; Albert E. Cox, Hardwick; *Secretary* and *Treasurer*, L. C. Chickering, Brattleboro.

WISCONSIN.

Wisconsin Pharmaceutical Association elected the following officers: *President*, John L. Huber, Racine; *Vice-Presidents*, Arthur Broenen, South Milwaukee; Carl Hendricks, Superior; M. C. Whitrock, Wisconsin Rapids; *Secretary*, Jennings Murphy, South Milwaukee; *Treasurer*, Bruno F. Liedel, Milwaukee. S. H. Dretzka, retiring president, was elected *Delegate* to the A. PH. A. meeting.

Speaking on the work of the Interprofessional Relationship Committee, Ralph W. Clark suggested that dentists be added to the list of professional men getting prescription suggestions from the druggists.

LOUISIANA PHARMACY BUILDING.

Louisiana State University has applied to the Public Works Administration for a grant of $1,035,000.00 toward construction of a new 14-

story pharmacy and medical building. The cost of the entire project was fixed at $2,292,-456.00. The application was made by Dr. James M. Smith, president of the University, as part of the extension to the medical center to provide housing and facilities for schools of pharmacy, dentistry and graduate school of medicine, and additional facilities for the present school of medicine.

(*To be continued.*)

BRITISH PHARMACEUTICAL CONFERENCE.

LIST OF SCIENCE PAPERS.

The following papers have been received for communication to the Belfast meeting of the British Pharmaceutical Conference, and will be read at the Science Sessions, June 25th and 26th: "Thyroid Standardization and Dosage," R. F. Corran, J. Pritchard and F. E. Rymill.

"The Effects of Hot Solvents on Ergot; with a Note on the Effects of Storage on the Activity of Ergot," R. F. Corran and F. E. Rymill. "The Estimation of the Mercury Content of Mercurochrome," R. F. Corran and F. E. Rymill.

"The Determination of Ferrous Iron in Presence of Organic Matter by Heisig's Method," G. J. W. Ferrey.

"Observations on the Preparation and Properties of Iodoform and Thymol Iodide," Norman Glass.

"The Preparation of Sterile Solution—II," H. Davis.

"The Assay of Glyceryl Trinitrate Tablets," Wilfred Smith. "Glyceryl Trinitrate Tablets," H. O. Meek. "Percolation of Cinchona and Belladonna; the Rate of Alkaloid Extraction and Effect of Degree of Comminution," A. W. Bull.

"A Note on Isopropyl Nitrite," C. L. M. Brown.

"The Glycols (with special reference to Propylene Glycol)," C. L. M. Brown.

"The Melting Point of Chloral Formamide," C. T. Bennett and N. R. Campbell.

"Alcohol Content and Specific Gravities of Tinctures of the British Pharmaceutical Codex," 1934, C. T. Bennett and F. C. L. Bateman.

"The Use of Rabbits in the Assay of Digitalis, Strophanthus and Squill," G. N. Rapson and S. W. F. Underhill.

"The Oestrogenic Activity of the Urine of Cows during Pregnancy," M. M. O. Barrie, J. B. E. Patterson and S. W. F. Underhill.

"The Deterioration of Atropine Eye Ointments on Storage," Noel L. Allport, A. I. C.

"An Improved Method for the Estimation of the Essential Oil Content of Drugs," T. Tusting Cocking and G. Middleton.

"The Relative Merits of Maceration and Percolation for the Preparation of Tincture of Digitalis," H. Berry and H. Davis.

"A Note on the Spectrographic Absorption of Ergometrine in Relation to the Maurice Smith Colour Test," Noel L. Allport and S. K. Crews.

"The Determination of Lead in Its Official Compounds and Preparations," S. Wetherell.

"The Stability of Aqueous Solution of Ouabain and K. Strophanthin," H. Berry.

"The Analysis of Some Complex B. P. C., Ointments," D. C. Garratt. "Estimation of the Extractives of Capsicum," H. Berry.

THE MEDICAL ASSOCIATION MEETING AT ATLANTIC CITY.

Liberty is taken in quoting from *Merck's Report* on the program of the Scientific Assembly of the American Medical Association. Looming large are the possibilities of vitamin and endocrine therapy, forecasting possible revolutionary changes in the treatment of many diseases. "Studies on Crystalline Vitamin B_1: Experimental and Clinical Observations," by Drs. Martin G. Vorhaus, Robert R. Williams and Robert E. Waterman, New York, was a paper representative in the vitamin field. Among those enlisting interest in the field of endocrinology were the papers on "The Antihormone Theory in Relation to Anterior Pituitary Physiology," by Dr. James B. Collip, Montreal, Que.; "Recent Advances in Knowledge of the Relationship of the Pituitary to Ovarian Hormones," by Dr. David P. Barr, St. Louis; "Thyroxine and the Hormone Elaborated by the Adrenal Cortex," by Dr. E. C. Kendall, Rochester, Minn.; "Experimental Studies on Replacement Therapy in Adrenal Insufficiency," by Drs. Arthur Grollman and W. M. Firor, Baltimore; "Comparative Effects of Pressor and Oxytoxic Fractions of Posterior Pituitary Extract on Blood Pressure and Intestinal Activity," by Dr. Kenneth I. Melville, Montreal, Que.; "The Biologic Effects following the Continuous Administration of Pineal Extract to Successive Genera-

tions," by Drs. Leonard G. Rowntree and J. H. Clark, Philadelphia, and A. M. Hanson, Faribault, Minn.; and "The Pharmacology of Testicular Hormones," by Dr. D. Roy McCullagh, Cleveland. This last paper is of interest in that the possible treatment of prostatic hypertrophy appears to be foreshadowed, following the suspicion of the author of the presence of a second testicular hormone called "Inhibin."

The paper by Fred E. Angle, entitled "Treatment of Acute and Chronic Brucellosis (Undulant Fever)" emphasizes the specificity of undulant fever vaccine therapy, with special reference to its preparation, the selection of strains, dosage, method of administration, reactions and contraindications for its use.

The Scientific Exhibit was outstanding. Here again vitamins and endocrinology played an important rôle. Drs. Irving S. Wright, A. W. Duryee and co-workers also showed the spectacular results obtained in their first nine cases of chronic leg ulcer treated with Mecholyl iontophoresis. All of these cases were of long duration, had failed to heal with other therapy, and were discharged as cured with complete healing. The National Formulary Exhibit was reported on in the June issue of the JOURNAL A. PH. A., page 520.

VIRGINIA PHARMACEUTICAL ASSOCIATION.

The 54th annual convention of the Virginia Pharmaceutical Association was held at Virginia Beach, June 17th to 19th. The measure which received most attention was a Fair Trade Bill similar to the California Law. The Association went on record disapproving the requesting of medicine from manufacturers for distribution at District meetings.

A resolution was adopted to amend the existing pharmacy law. The business must be operated under the direct supervision of a registered pharmacist, and an assistant pharmacist may temporarily act in his place.

ILLINOIS PASSES FAIR TRADE ACT.

The Illinois House passed without opposition the Fair Trade Act approved a few days earlier by the Senate. It is expected that the bill will be signed promptly by Governor Horner.

DELAWARE.

Delaware Pharmaceutical Association decided that, in the event that no similar federal legislation be enacted by Congress before 1937, the Society will fight for the enactment of a Delaware fair trade law at the 1937 session of the State Legislature. Dr. Robert L. Swain, of Baltimore, described the operation of the Maryland fair trade law. Among other speakers were: Thomas S. Smith, Wilmington; Walter L. Morgan, Wilmington; James W. Wise, Dover; and Albert Williams, Laurel. The election of officers resulted as follows: *President*, George W. Brittingham, Wilmington; *Vice-Presidents*, E. J. Elliott, Bridgeville, Frank Brereton, Milford; Paul Potocki, Wilmington; *Secretary*, Albert Bunin, Wilmington; *Treasurer*, Albert Dougherty, Wilmington. The new board of directors consists of Thomas S. Smith, Walter L. Morgan and Paul Potocki, Wilmington, and Harry P. Jones, Smyrna.

PRESCRIPTIONS IN 1885.

The *Pharmaceutical Record*, in 1885, published a paper by G. W. Sloan, former President of the AMERICAN PHARMACEUTICAL ASSOCIATION, read before the Indiana Pharmaceutical Association, giving an analysis of 1000 prescriptions dispensed in a store, where the formulas of a great number of physicians are dispensed. Twelve leading medicines were counted, and it was also ascertained in what proportion proprietary articles were ordered. The following is a summary of the results: Arsenic 41, bismuth 59, bromine 59, chloral 16, ergot 15, iron 128, iodine 60, mercury 60, nux vomica 130, opium 136, pepsin 42, quinine 238. Proprietary articles appear 68 times.—*The Chemist and Druggist*, June 22, 1935.

H. R.-8442 and S-3154.

Congressman Wright Patman and Senator Arthur R. Robinson have introduced similar bills, numbered as above, which have been referred to the Committee on Judiciary in both branches of Congress. The bill makes it unlawful for any person engaged in commerce to discriminate in price or terms of sale between purchasers of commodities of like grade and quality, to prohibit the payment of brokerage or commission under certain conditions, to suppress pseudo-advertising allowances, to provide a presumptive measure of damages in certain cases, and to protect the independent merchant, the public whom he serves, and the manufacturer from whom he buys, from exploitation by unfair competitors.

The bill seems to have the embodiment of a measure which will give protection to the small dealer by the establishment of fair dealing.

J. K. Lilly, *Honorary President* of the A. PH. A. and chairman of the board of directors of Eli Lilly & Co., Indianapolis, was recently married to Mrs. Lila Allison Humes.

We are just advised of the death of W. F. Michel, editor of *The Optimist.*

Governor Hoffman has appointed **President Robert P. Fischelis** of the AMERICAN PHARMACEUTICAL ASSOCIATION, who is Chairman of the Conference on Allied Medical Professions of the State of New Jersey, comprising the profession of Medicine, Pharmacy, Dentistry and Nursing, a member of the Committee to study the problems of unemployment insurance and of old-age relief, etc.

NOTICE TO CONTRIBUTORS TO THE JOURNAL AMERICAN PHARMACEUTICAL ASSOCIATION.

The following notice has been prepared from comments received from members of the Board of Review of Papers and of the Publication Committee.

Manuscripts should be sent to Editor E. G. Eberle, 2215 Constitution Ave., N. W., Washington, D. C.

All manuscripts should be typewritten in double spacing on one side of paper $8^1/_2$ x 11 inches, and should be mailed in a flat package—not rolled. The original (*not* carbon) copy should be sent. The original drawings, not photographs of drawings, should accompany the manuscript. Authors should indicate on the manuscript the approximate position of text figures. All drawings should be marked with the author's name and address.

A condensed title running page headline, not to exceed thirty-five letters, should be given on a separate sheet and placed at the beginning of each article.

The method of stating the laboratory in which the work is done should be uniform and placed as a footnote at end of first page, giving Department, School or College. The date when received for publication should be given.

Numerals are used for figures for all definite weights, measurements, percentages, and degrees of temperature (for example: 2 Kg., 1 inch, 20.5 cc., 300° C.). Spell out all indefinite and approximate periods of time and other numerals which are used in a general manner (for example: one hundred years ago, about two and one-half hours, seven times).

Standard abbreviations should be used whenever weights and measures are given in the metric system, *e. g.*, 10 Kg., 2.25 cc., etc. The forms to be used are: cc., Kg., mg., mm., L. and M.

Figures should be numbered from 1 up, beginning with the text-figures (line engravings are always treated as text-figures and should be designated as such) and continuing through the plates. The reduction desired should be clearly indicated on the margin of the drawing. All drawings should be made with India ink, preferably on white tracing paper or cloth. If coördinate paper is used, a blue-lined paper must be chosen. Usually it is desirable to ink in the large squares so that the curves can be more easily read. Lettering should be plain and large enough to reproduce well when the drawing is reduced to the width of a printed page (usually about 4 inches). Photographs intended for half-tone reproduction should be securely mounted with colorless paste.

"Figure" should be spelled out at the beginning of a sentence; elsewhere it is abbreviated to "Fig.;" per cent—2 words.

The expense for a limited number of figures and plates will be borne by the JOURNAL; expense for cuts in excess of this number must be defrayed by the author.

References to the literature cited should be grouped at the end of the manuscript under the *References.* The citations should be numbered consecutively in the order of their appearance (their location in the text should be indicated by full-sized figures included in parentheses). The sequence followed in the citations should be: Author's name (with initials), name of publication, volume number, page number and the date in parentheses. Abbreviations for journals should conform to the style of *Chemical Abstracts,* published by the American Chemical Society.

(1) Author, A. Y., *Am. J. Physiol,* 79, 289 (1927).

Papers presented at the Sections of the AMERICAN PHARMACEUTICAL ASSOCIATION'S annual meeting become the property of the ASSOCIATION and may at the discretion of the Editor be published in the JOURNAL. Papers presented at these Sections may be published in other periodicals only after the release of the papers by the Board of Review of Papers of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Editor will appreciate comments from Board of Review and Committee on Publication, members, authors and others interested.